IDG

COMPUTERWORLD

THE NEWSPAPER FOR IT LEADERS • WWW.COMPUTERWORLD.COM

MAY 20, 2002 • VOL. 36 • NO. 21 • $5 COPY

KNOWLEDGE CENTER DEVELOPMENT

New Tools, New Choices

IT managers are facing big decisions about whether to use Java or Microsoft's new .Net for software development and whether to plunge into much-hyped Web services. Highlights of our special report include:

- **Five factors** to consider when choosing .Net or Java 2 Enterprise Edition.
- **How to select** the right tools for building Web services.
- **Three users** try to integrate legacy applications that were never meant to be integrated.

STORIES BEGIN ON PAGE 27.

ONLINE COVERAGE

Here's a sampling of the additional features at www.computerworld.com QuickLink: k1100

- Software guru Grady Booch discusses the future of software development and Web services.
- Can enterprise application integration and Web services coexist?

WIRELESS LANs 'CRITICAL' FOR GM

Automaker expects payback within a year

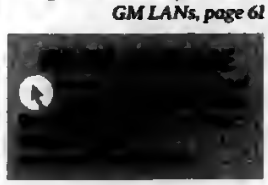
BY BOB BREWIN

Viewing wireless LANs as a mission-critical infrastructure for its manufacturing operations, General Motors Corp. by year's end will have installed them in all 25 of its North American assembly plants.

GM will initially use the massive in-plant wireless LAN infrastructure to track materials and replenish parts at stations on its assembly lines. But once the wireless LANs are in place, according to Clif Triplett, global information officer for manufacturing and quality at GM, they can be used to support a wide range of other applications. Those include access to computer-aided design drawings and plant configuration information, which Triplett called a "virtual factory" database.

Larry Graham, global manager of manufacturing technologies for GM, said the factory wireless LAN infrastructure will bring about a "quantum change" in the ability of GM to

GM LANs, page 61



NEWSPAPER

PROQUEST
PO BOX 994
ANN ARBOR MI 48106-0994

71
68-2

DOD IT PROJECTS COME UNDER FIRE

Wireless LAN security lapse at defense agency

BY BOB BREWIN

For weeks, the agency responsible for the U.S. Department of Defense's global networks and classified command and control systems had a gaping security hole in its own front yard. Security cameras at its Arlington, Va., headquarters were connected to a nonsecure wireless LAN until last week.

Chris O'Ferrell, chief technology officer at NetSec Inc. in Herndon, Va., which provides intrusion-detection services to

LAN Security, page 14

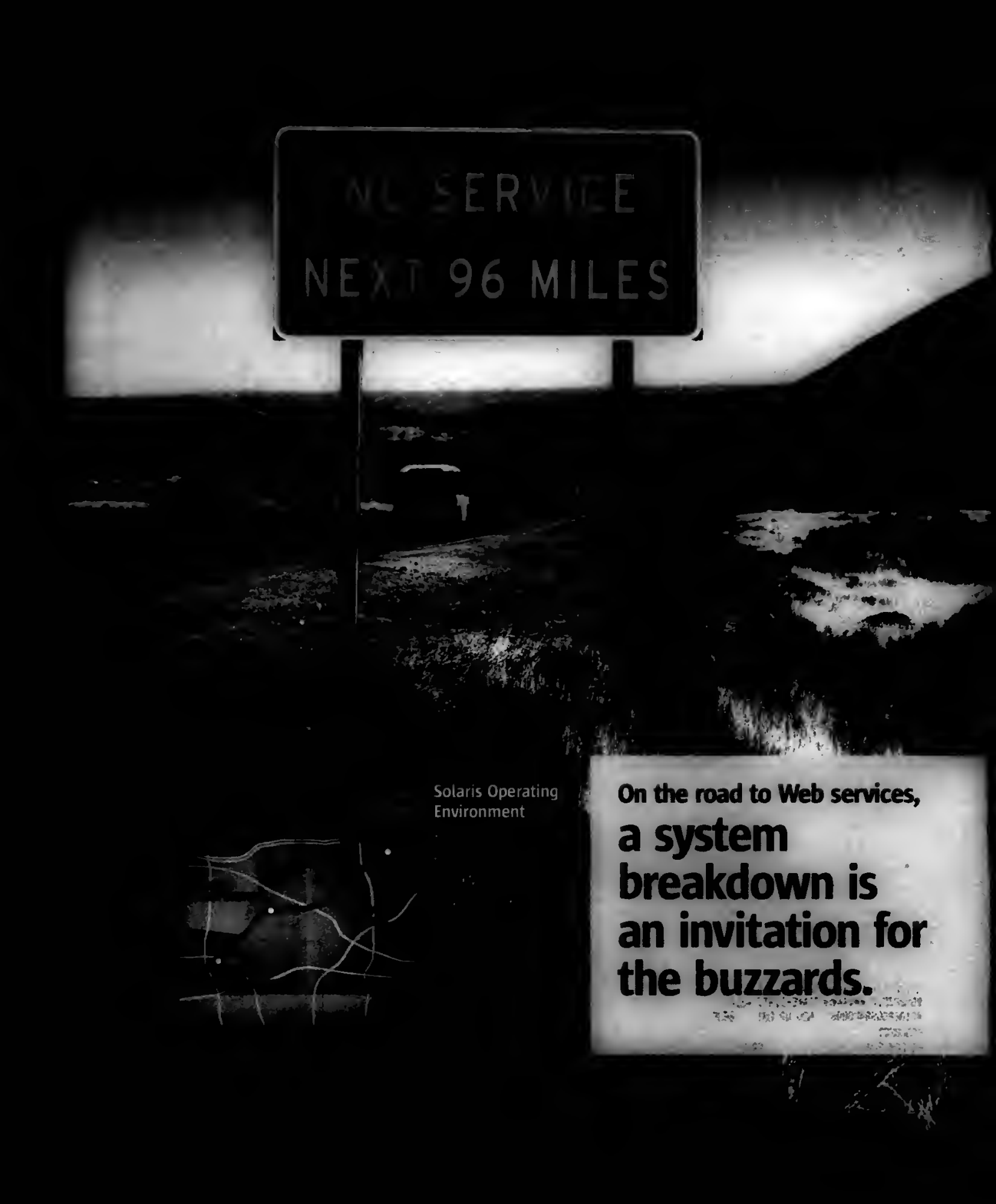
Navy intranet battles deployment threats

BY DAN VERTON

Despite the recent fanfare surrounding what the U.S. Navy called a successful test and evaluation phase of its $6.9 billion Navy/Marine Corps Intranet program, deployment problems are threatening the project, according to internal memos obtained by *Computerworld*.

In an April 25 e-mail to employees of Plano, Texas-based Electronic Data Systems Corp., the Navy's prime contractor on

Navy Intranet, page 16



Solaris Operating Environment

On the road to Web services,

a system breakdown is an invitation for the buzzards.

Sun™ ONE
Open Net Environment

Reports from the road: Virgin Atlantic Airways.
The Solaris Operating Environment ensures that applications for Virgin Atlantic Airways – from Web-based frequent flier information to mission-critical flight operations – are easily manageable and readily available.

Reports from the road: Wingcast.
Thanks to Wingcast, cars will soon be equipped with wireless safety, communication and convenience services. Anticipating millions of wired vehicles to come, Wingcast wisely chose the Solaris 8 Operating Environment for its scalability and reliability.

Sun's associates for the ride.
Sun teams with some of the best systems integrators in the business providing the knowledge and experience you need to help you deploy your Web services on the Solaris platform today: Cap Gemini Ernst & Young, Deloitte Consulting, EDS, KPMG Consulting, Inc. and PricewaterhouseCoopers.

Act now to get your
free copy of Solaris 9 OE on DVD.
www.sun.com/solarisdvd
Offer valid while supplies last.

Keep your services engine running on all cylinders with the Solaris™ Operating Environment.

Once you get your Web services built, you're ready for the big road test: deployment. It doesn't matter how bulletproof your Web services are if they don't work all the time and they're not secure. The Solaris™ OE is a secure, reliable way to protect your Web services investment and your hard-earned reputation for dependable service. Solaris, supporting many of the largest Internet businesses, is the foundation of Sun™ ONE and provides a rock-solid application platform for any kind of Web service.

Sun

ca smart Program Guideline:

The ca smart logo is only to be used by CA partners for innovative eBusiness products or solutions on which CA technology resides, is a component of, or is otherwise integrated. Which would not include sporting goods
For more information, visit ca.com/casmart.

ca Computer Associates™

©2001 Computer Associates International, Inc. (CA). All trademarks, trade names, service marks, and logos referenced herein belong to their respective companies.

COMPUTERWORLD THIS WEEK

NEWS 6

6 Insurance and banking firms claim that a data privacy bill in the U.S. Senate could drive up online costs and require changes to privacy compliance systems.

6 WorldCom announces a nationwide data networking service that supports the use of Ethernet over metro- and wide-area networks.

7 IBM details planned additions to its DB2 databases at a North American user group conference, but some users have their own wish lists for the software.

8 Sun's StarOffice desktop application sells for a lot less than Microsoft's Office XP, but it's unclear whether that will persuade Office users to jump ship.

10 The planned acquisition of Lands' End by Sears poses new IT challenges for the catalog and online retailer. Plus, a Q&A with Sears CIO Jerry Miller.

OPINIONS

Maryfran Johnson 24
Pimm Fox 24
Dan Gillmor 25
Frank Hayes 62
Letters 25

How to Contact CW 60
Company Index 60
Shark Tank 62

ONLINE

WHAT'S A QUICKLINK?

On some pages in this issue, you'll see a QuickLink code pointing to additional, related content on our Web site. Just enter that code into our QuickLink box online, which you'll see at the top of each page on our site.

Use QuickLinks to see related stories, discussion forums, research links, archives and more.

BREAKING NEWS

For breaking news, updated twice daily, visit:
QuickLink: a1510
www.computerworld.com

ILLUSTRATIONS BY PEP MONTSERRAT

MAY 20 2002

COMPUTERWORLD

NEWS 6

6 Insurance and banking firms claim that a data privacy bill in the U.S. Senate could drive up online costs and require changes to privacy compliance systems.

6 WorldCom announces a nationwide data networking service that supports the use of Ethernet over metro- and wide-area networks.

7 IBM details planned additions to its DB2 databases at a North American user group conference, but some users have their own wish lists for the software.

8 Sun's StarOffice desktop application sells for a lot less than Microsoft's Office XP, but it's unclear whether that will persuade Office users to jump ship.

10 The planned acquisition of Lands' End by Sears poses new IT challenges for the catalog and online retailer. Plus, a Q&A with Sears CIO Jerry Miller.

OPINIONS

Maryfran Johnson	24
Pimm Fox	24
Dan Gillmor	25
Frank Hayes	62
Letters	25

How to Contact CW	60
Company Index	60
Shark Tank	62

ONLINE

WHAT'S A QUICKLINK?

On some pages in this issue, you'll see a QuickLink code pointing to additional, related content on our Web site. Just enter that code into our QuickLink box online, which you'll see at the top of each page on our site.

Use QuickLinks to see related stories, discussion forums, research links, archives and more.

BREAKING NEWS

For breaking news, updated twice daily, visit
QuickLink: a1510
www.computerworld.com

KNOWLEDGE CENTER DEVELOPMENT

SPECIAL REPORT

27 New Tools, New Choices

EDITOR'S NOTE: This special report on application development helps IT managers make the big decisions about .Net, Java and Web services.

28 The Story So Far The history of application development in 600 words — from haphazard "code and fix" to structured methodologies to Extreme Programming.

30 .Net vs. Java IT managers have five big factors to consider when they weigh the merits of Microsoft's new .Net development environment against Java.

ONLINE: Microsoft continues to battle a perception problem regarding the scalability of the .Net environment. **QuickLink: 29656**

34 Field Report: How to choose the right tools for designing and building Web services and how organizations are using them.

ONLINE: A look at two lighter-weight tool kits suitable for smaller applications. **QuickLink: 29439**

36 ROI: Texas A&M University's XML-based service allows information about students, budgets and payroll to be shared among dozens of disparate systems and cuts development time in half.

38 Opinion: Saving money is fine when you're developing your own Java applications. But if you want to build apps that will make end users truly happy, spending more now will help you avoid grief from end users later, says columnist Kevin Fogarty.

40 Safer Than You Think? Security for Web services is a major hurdle, but some companies are deploying Web services anyway — after evaluating the risks and benefits.

ONLINE: Find out how Microsoft, IBM, BEA and Sun plan to bolster the security of Web services. **QuickLink: 29013**

44 Extreme Integration Follow the trail of three users as they attempt to integrate their legacy systems.

48 Book Excerpt: Software guru Watts S. Humphrey says the application development group can be a competitive asset — or a business disaster. Also, Humphrey says most software projects go awry because of unrealistic deadlines.

52 Careers: A roundup of skills, training and salary information for Java developers.

ONLINE: Why classroom training in Java development doesn't impress some employers. **QuickLink: 29401**

54 Opinion: Columnist Nicholas Petreley touts the virtues of Qt, a development tool sometimes overlooked in the debate around C# and Java.

WWW.COMPUTERWORLD.COM

APP DEVELOPMENT CASE STUDIES

Three organizations are getting a nice return from their application development projects. Two are focused on code reusability, and a third has a mobile application.
QuickLink: 29725

THE FUTURE OF SOFTWARE DEVELOPMENT

Q&A: Software guru Grady Booch discusses modeling, complexity, the future of software development and the flaws in Web services.
QuickLink: 28748

THE CHANGING FACE OF APP INTEGRATION

Web services may eventually wipe out traditional application integration, but for the next few years, integration technology will evolve alongside Web services.
QuickLink: 29755

AT DEADLINE

Microsoft Stands by New Patch for IE

Microsoft Corp. urged users to install a patch designed to plug six newly discovered security holes in its Internet Explorer (IE) Web browser, despite claims by security researchers that the patch doesn't fix all the problems. The company said the researchers exposed a another potential vulnerability that appears similar to the other six but affects a different piece of IE code. Another patch will be issued if that is a bona fide hole, it said.

Network Associates To Restate Results

Network Associates Inc. said it plans to restate its financial results for 1998 through 2000 after discovering inaccurate accounting entries. CEO George Samenuk said the errors "appear to be linked to one individual" who has since left the Santa Clara, Calif.-based security software vendor. The restatements are due to be filed next month.

Reports Taken From Agency's Systems

Ford Motor Co.'s credit unit notified 13,000 people that hackers had used a stolen authorization code belonging to Ford to download personal credit reports from the systems at Experian, a reporting agency with U.S. headquarters in Costa Mesa, Calif. But Ford said it was unclear whether the perpetrators broke into its computers to steal the code.

Enterasys Delays Q1 Results Due to Audit

Enterasys Networks Inc. said its first-quarter results will be delayed until July because of an ongoing review of last year's sales. But the Portsmouth, N.H.-based networking vendor noted that it expects to break even on operating cash flow by the fourth quarter.

Conflicting Privacy Rules Alarm Financial Firms

Bill would force change to opt-in model

BY PATRICK THIBODEAU
WASHINGTON

A MAJOR PRIVACY bill in the U.S. Senate is drawing opposition from trade groups, especially from financial services firms worried that the measure may force them to change their privacy compliance systems.

The Gramm-Leach-Bliley Act, which took effect last July, requires financial service firms to let customers opt out of data sharing. But these firms now face the prospect of an opt-in model — meaning that a consumer's personal information couldn't be shared without his approval — if a bill pushed by Sen. Ernest "Fritz" Hollings (D-S.C.), chairman of the Commerce, Science and Transportation Committee, survives. That bill was expected to win the approval of Hollings' committee.

"What's being created is a hodgepodge patchwork" of privacy rules, said Chris Apgar, who heads data security at Providence Health Plan in Beaverton, Ore. "No one has taken the time to step back and say what makes sense," he said.

As an insurer and health care provider, Providence follows Gramm-Leach-Bliley and privacy rules in the Health Insurance Portability and Accountability Act (HIPAA). Apgar, who is also HIPAA's compliance officer, said health care and insurance privacy rules already conflict.

Last week the Financial Services Coordinating Council, which represents a coalition of insurance and banking trade groups, said the Hollings bill would drive up the cost of providing online services.

Even if Hollings' bill wins full Senate backing, it faces a more difficult challenge reconciling with a more business-friendly House privacy bill.

Hollings' bill will bog down in the House, said House bill sponsor Jim Moran (D-Va.), speaking at a U.S. Chamber of Commerce privacy forum last week. "I doubt that we will get a bill passed this year," he said.

John Stevens, manager of testing environments at Blue Cross Blue Shield in Eagan, Minn, said more regulation is inevitable. Under HIPAA, Stevens is required to take a number of steps to protect privacy, ones that may foreshadow what other companies will have to do if Congress expands privacy protections to other businesses.

Stevens is using a tool from Compuware Corp. in Farmington Hills, Mich., that lets him take patient data from production and disguise it for use in test environments. Stevens said his data is protected from external threats, but privacy rules also require internal protection of data. "The real challenge is making sure that people see what they are supposed to see and nothing else," he said.

Richard Stiennon, an analyst at Gartner Inc. in Stamford, Conn., and a former auditor, said IT sometimes overlook test environments in data protection, but auditors usually look for security vulnerabilities there. "That's where the richest ground was found," he said.

PROMOTING P3P
Firms begin adopting the Platform for Privacy Preferences standard
QuickLink: 29080
www.computerworld.com

Comparing Bills

Key differences in the House and Senate privacy bills:

	SENATE	HOUSE
Applies to online only	X	
Allows private lawsuits	X	
Requires privacy notice	X	X
Opt-out for personal data	X	X
Opt-in for sensitive data*	X	
Access**	X	
Preempts state privacy laws	X	X

*Sensitive data includes financial and medical information as well as sexual orientation and ethnic identification.
**The Hollings bill requires companies to permit consumers to see personal data but lets them charge up to $3 for access.

WorldCom Steps Up Wide-Area Ethernet Coverage

Provides alternative to frame relay, ATM

BY MICHAEL MEEHAN

Giving the idea of using Ethernet beyond the LAN a boost, WorldCom Inc. last week unveiled a nationwide data networking service that offers Ethernet across metropolitan- and wide-area networks.

WorldCom isn't the first to make that kind of service available. Other vendors, including Denver-based Qwest Communications International Inc., already support Ethernet above the LAN level. But WorldCom is launching the broadest national coverage to date, said Marian Stasney, an analyst at The Yankee Group in Boston.

Houston-based law firm Andrews & Kurth LLP went live as a beta-test user of the WorldCom metro-area service late last month. Lynn McGuire, IT director at Andrews & Kurth, said the service will let the firm move its IT and accounting operations to a cheaper location in the city and connect them back to its headquarters.

"We're interested in it because we're comfortable with Ethernet," McGuire said. "You can make a major change like moving people to a new building, and it will seem like a non-event for your users." By contrast, he added, the frame-relay networking service that the firm was using before didn't have enough bandwidth or throughput to handle its billing system.

Almost all transactions start and end using Ethernet data transfer protocols, Stasney said. But as they head out over wider networks, they often have to be converted to frame-relay or Asynchronous Transfer Mode protocols. Extending Ethernet "eliminates all kinds of garbage in the middle," Stasney said.

WorldCom Group, the firm's data network unit, will offer LAN-to-LAN services in 84 U.S. metropolitan areas and make Ethernet services available for Internet or virtual private network (VPN) connections in seven cities. The services are built around technology from Brampton, Ontario-based Nortel Networks Ltd.

Clint Fast, network administrator at Allied Building Products Corp. in East Rutherford, N.J., said he plans to use a similar metro-area Ethernet convergence service by MegaPath Networks Inc. in Pleasanton, Calif. Currently, Allied runs its network on 75 separate Digital Subscriber Line connections. Linking those as part of a single Ethernet-based VPN will let the company proceed with voice over IP and supply chain projects that require a more robust communications backbone, Fast said.

MORE ON NETWORKS
For the latest resources and news, visit our Networking Knowledge Center
QuickLink: kt200
www.computerworld.com

DB2 Plans Prompt Enthusiasm, Wish Lists

Self-managing capabilities, improved 64-bit mainframe support in the works

BY MARC L. SONGINI
SAN DIEGO

IBM last week detailed a series of upcoming enhancements to its DB2 databases at the annual North American conference of the software's user group. Users at the conference showed enthusiasm about some of the planned new features, but several said they have additional wish list items that they want IBM to address.

The promised capabilities include new "smart database" self-managing tools and the ability for the flagship DB2 Universal Database software to take better advantage of IBM's 64-bit mainframe technology. Some of those features are due to become available later this year, IBM said (see chart).

Robert Catterall, director of strategic technology for the e-commerce division at DB2 user CheckFree Corp. in Norcross, Ga., said he especially likes the sound of some of the 64-bit architecture features that IBM has in the works for the mainframe version of the database. For example, memory efficiencies will hopefully reduce the amount of CPU cycles that DB2 needs to use, he said.

The self-managing features would also be helpful, Catterall added. "We're trying to grow the [data] workload without growing the personnel at the same rate," he said.

But Catterall said the Unix and Windows versions of DB2 are "somewhat more feature-rich" than the mainframe one. The gap was reduced by Versions 6 and 7 of DB2 for OS/390 and z/OS, he said. But, he added, "I'd like to see it close further, preferably to the point of being eliminated."

That would make it easier to do cross-platform development for DB2, said Catterall. CheckFree, which sells e-business software and services, is also installing DB2 for Unix and wants its developers to be able to use the same tools across the board, he said.

Kathy Komer, president of the Chicago-based International DB2 Users Group, said she wants to see more complete integration between DB2 and related products, such as IBM's WebSphere application server. IBM has made some progress in that area, said Komer, who works as a database architect at insurer Aetna Inc. in Hartford, Conn. But, she added, "we don't believe they're done yet."

Jeff Jones, director of strategy for IBM's data management solutions, said the company is working to close the functionality gap between different DB2 releases. It already supports the ability to create repeatable processes that let users transfer SQL commands from one version of the database to another, he said.

In addition, an IBM spokeswoman said the next release of DB2 for OS/390 and z/OS will include a tool that can automatically summarize information, such as monthly sales totals. The feature is already included in DB2 for Unix and Windows.

IBM is also focused on more completely integrating its different software products with one another, including DB2, the spokeswoman added. ▶

On the Way

DUE OUT LATER THIS YEAR:

- Support within mainframe DB2 for more fully exploiting IBM's 64-bit zSeries systems
- Additional self-managing and system resource tuning capabilities

OTHER ENHANCEMENTS IN THE WORKS:

- Continued efforts to tighten integration with other IBM products, such as WebSphere
- The ability to reorganize data without having to take a database down
- Support for developing Microsoft .Net apps on DB2 for Windows

Microsoft Trial Remedy Phase Closes With Dramatic E-Mail

Suggests retaliation against PC makers supporting Linux

BY PATRICK THIBODEAU
WASHINGTON

Just three months after Microsoft trial judge Thomas Penfield Jackson ruled that Microsoft Corp. "placed an oppressive thumb on the scale of competitive fortune," a top Microsoft executive sent a memo to Bill Gates and other officials recommending "underground" retaliatory actions against PC makers developing Linux-compatible devices.

In the August 2000 memo, Joachim Kempin, who headed original equipment maker relations for Microsoft at the time, complained that Intel Corp. was encouraging employees at large PC makers to support Linux and fund devices that would work well with the operating system.

Kempin said that to "play this the hard way" would "get more attention then we need." Instead, he concluded that Microsoft should "work underground with the clear understanding to promote and advantage guys with less market share without declaring that to be our strategy. I would further try to restrict source-code deliveries where possible and be less gracious when interpreting agreements — again without being obvious about it."

A Microsoft spokesman dismissed the memo as "random thoughts" that were never acted upon. Also, in a deposition, CEO Steve Ballmer characterized the memo's author as "prone to hyperbole."

CASE HISTORY
For complete *Computerworld* coverage of the Microsoft antitrust trial, visit
QuickLink: s1100
www.computerworld.com

Memo in Limbo

The memorandum was probably the most dramatic piece of e-mail evidence the nine nonsettling states produced in the remedy phase, and they had planned to use it to strengthen their legal arguments that stronger anti-retaliatory provisions are needed in the final remedy.

But the memo is in procedural limbo. Judge Colleen Kollar-Kotelly is clearly aware of it but hasn't officially admitted it into the record. She has been very cautious about what does get entered. "This judge is a stickler for procedure," said Bob Lande, an antitrust professor at the University of Baltimore Law School.

Throughout the trial, Kollar-Kotelly has consistently ruled in favor of Microsoft on many procedural motions. But in court last week, she was a changed person. For the first time, she challenged both sides on a range of legal issues in an effort to sort out legal positions. Her questions seemed evenhanded.

In particular, she zeroed in on the key issue of the case of whether the Court of Appeals' decision finding that Microsoft had illegally maintained its monopoly opened the door for the range of remedies affecting handhelds, set-top boxes, server operating systems and Web services.

Kollar-Kotelly wouldn't tip her hand but isn't ruling out the possibility of a broader remedy and discussed in court whether these other technologies "are now in need of protection." Both sides argued their points before the only person who can answer that question. ▶

IBM Works on Marketing Challenges

IBM took over the top spot in the overall database market last year, according to sales data released this month by Stamford, Conn.-based Gartner Inc. But attendees at the DB2 conference said IBM has to work harder on marketing if it wants to make more inroads with Unix and Windows users.

"They still have work to do in building mind share in the Unix [database] market," said Robert Catterall, director of strategic technology for the e-commerce division at CheckFree.

Database users tend to be conservative and generally stick with what they have, noted James Governor, an analyst at Nashua, N.H.-based Illuminata Inc. IBM has increased its marketing efforts for the Unix and Windows versions of DB2, Governor said. But he added that the database still hasn't penetrated Oracle Corp.'s installed base of users as quickly as IBM officials would like.

Kathy Komer, president of the International DB2 Users Group, said IBM in the past was more comfortable dealing with the largest companies. But it's learning how to sell to a wider range of users, she added.

An IBM spokeswoman said the company is working to address the awareness issue in the Unix and Windows markets through a new marketing campaign designed to highlight those versions of DB2. - *Marc L. Songini*

AT DEADLINE

Microsoft Stands by New Patch for IE

Microsoft Corp. urged users to install a patch designed to plug six newly discovered security holes in its Internet Explorer (IE) Web browser, despite claims by security researchers that the patch doesn't fix all the problems. The company said the researchers exposed a another potential vulnerability that appears similar to the other six but affects a different piece of IE code. Another patch will be issued if that is a bona fide hole, it said.

Network Associates To Restate Results

Network Associates Inc. said it plans to restate its financial results for 1998 through 2000 after discovering inaccurate accounting entries. CEO George Samenuk said the errors "appear to be linked to one individual" who has since left the Santa Clara, Calif.-based security software vendor. The restatements are due to be filed next month.

Reports Taken From Agency's Systems

Ford Motor Co.'s credit unit notified 13,000 people that hackers had used a stolen authorization code belonging to Ford to download personal credit reports from the systems at Experian, a reporting agency with U.S. headquarters in Costa Mesa, Calif. But Ford said it was unclear whether the perpetrators broke into its computers to steal the code.

Enterasys Delays Q1 Results Due to Audit

Enterasys Networks Inc. said its first-quarter results will be delayed until July because of an ongoing review of last year's sales. But the Portsmouth, N.H.-based networking vendor noted that it expects to break even on operating cash flow by the fourth quarter.

Conflicting Privacy Rules Alarm Financial Firms

Bill would force change to opt-in model

BY PATRICK THIBODEAU
WASHINGTON

A MAJOR PRIVACY bill in the U.S. Senate is drawing opposition from trade groups, especially from financial services firms worried that the measure may force them to change their privacy compliance systems.

The Gramm-Leach-Bliley Act, which took effect last July, requires financial service firms to let customers opt out of data sharing. But these firms now face the prospect of an opt-in model — meaning that a consumer's personal information couldn't be shared without his approval — if a bill pushed by Sen. Ernest "Fritz" Hollings (D-S.C.), chairman of the Commerce, Science and Transportation Committee, survives. That bill was expected to win the approval of Hollings' committee.

"What's being created is a hodgepodge patchwork" of privacy rules, said Chris Apgar, who heads data security at Providence Health Plan in Beaverton, Ore. "No one has taken the time to step back and say what makes sense," he said.

As an insurer and health care provider, Providence follows Gramm-Leach-Bliley and privacy rules in the Health Insurance Portability and Accountability Act (HIPAA). Apgar, who is also HIPAA's compliance officer, said health care and insurance privacy rules already conflict.

Last week the Financial Services Coordinating Council, which represents a coalition of insurance and banking trade groups, said the Hollings bill would drive up the cost of providing online services.

Even if Hollings' bill wins full Senate backing, it faces a more difficult challenge reconciling with a more business-friendly House privacy bill.

Hollings' bill will bog down in the House, said House bill sponsor Jim Moran (D-Va.), speaking at a U.S. Chamber of Commerce privacy forum last week. "I doubt that we will get a bill passed this year," he said.

John Stevens, manager of testing environments at Blue Cross Blue Shield in Eagan, Minn, said more regulation is inevitable. Under HIPAA, Stevens is required to take a number of steps to protect privacy, ones that may foreshadow what other companies will have to do if Congress expands privacy protections to other businesses.

Stevens is using a tool from Compuware Corp. in Farmington Hills, Mich., that lets him take patient data from production and disguise it for use in test environments. Stevens said his data is protected from external threats, but privacy rules also require internal protection of data. "The real challenge is making sure that people see what they are supposed to see and nothing else," he said.

Richard Stiennon, an analyst at Gartner Inc. in Stamford, Conn., and a former auditor, said IT sometimes overlook test environments in data protection, but auditors usually look for security vulnerabilities there. "That's where the richest ground was found," he said.

PROMOTING P3P
Firms begin adopting the Platform for Privacy Preferences standard
QuickLink: 29880
www.computerworld.com

Comparing Bills

Key differences in the House and Senate privacy bills:

	SENATE	HOUSE
Applies to online only	X	
Allows private lawsuits	X	
Requires privacy notice	X	X
Opt-out for personal data	X	X
Opt-in for sensitive data*	X	
Access**	X	
Preempts state privacy laws	X	X

*Sensitive data includes financial and medical information as well as sexual orientation and ethnic identification.
**The Hollings bill requires companies to permit consumers to see personal data but lets them charge up to $3 for access.

WorldCom Steps Up Wide-Area Ethernet Coverage

Provides alternative to frame relay, ATM

BY MICHAEL MEEHAN

Giving the idea of using Ethernet beyond the LAN a boost, WorldCom Inc. last week unveiled a nationwide data networking service that offers Ethernet across metropolitan- and wide-area networks.

WorldCom isn't the first to make that kind of service available. Other vendors, including Denver-based Qwest Communications International Inc., already support Ethernet above the LAN level. But WorldCom is launching the broadest national coverage to date, said Marian Stasney, an analyst at The Yankee Group in Boston.

Houston-based law firm Andrews & Kurth LLP went live as a beta-test user of the WorldCom metro-area service late last month. Lynn McGuire, IT director at Andrews & Kurth, said the service will let the firm move its IT and accounting operations to a cheaper location in the city and connect them back to its headquarters.

"We're interested in it because we're comfortable with Ethernet," McGuire said. "You can make a major change like moving people to a new building, and it will seem like a non-event for your users." By contrast, he added, the frame-relay networking service that the firm was using before didn't have enough bandwidth or throughput to handle its billing system.

Almost all transactions start and end using Ethernet data transfer protocols, Stasney said. But as they head out over wider networks, they often have to be converted to frame-relay or Asynchronous Transfer Mode protocols. Extending Ethernet "eliminates all kinds of garbage in the middle," Stasney said.

WorldCom Group, the firm's data network unit, will offer LAN-to-LAN services in 84 U.S. metropolitan areas and make Ethernet services available for Internet or virtual private network (VPN) connections in seven cities. The services are built around technology from Brampton, Ontario-based Nortel Networks Ltd.

Clint Fast, network administrator at Allied Building Products Corp. in East Rutherford, N.J., said he plans to use a similar metro-area Ethernet convergence service by MegaPath Networks Inc. in Pleasanton, Calif. Currently, Allied runs its network on 75 separate Digital Subscriber Line connections. Linking those as part of a single Ethernet-based VPN will let the company proceed with voice over IP and supply chain projects that require a more robust communications backbone, Fast said.

MORE ON NETWORKS
For the latest resources and news, visit our Networking Knowledge Center
QuickLink: k1200
www.computerworld.com

DB2 Plans Prompt Enthusiasm, Wish Lists

Self-managing capabilities, improved 64-bit mainframe support in the works

BY MARC L. SONDINI
SAN DIEGO

IBM last week detailed a series of upcoming enhancements to its DB2 databases at the annual North American conference of the software's user group. Users at the conference showed enthusiasm about some of the planned new features, but several said they have additional wish list items that they want IBM to address.

The promised capabilities include new "smart database" self-managing tools and the ability for the flagship DB2 Universal Database software to take better advantage of IBM's 64-bit mainframe technology. Some of those features are due to become available later this year, IBM said (see chart).

Robert Catterall, director of strategic technology for the e-commerce division at DB2 user CheckFree Corp. in Norcross, Ga., said he especially likes the sound of some of the 64-bit architecture features that IBM has in the works for the mainframe version of the database. For example, memory efficiencies will hopefully reduce the amount of CPU cycles that DB2 needs to use, he said.

The self-managing features would also be helpful, Catterall added. "We're trying to grow the [data] workload without growing the personnel at the same rate," he said.

But Catterall said the Unix and Windows versions of DB2 are "somewhat more feature-rich" than the mainframe one. The gap was reduced by Versions 6 and 7 of DB2 for OS/390 and z/OS, he said. But, he added, "I'd like to see it close further, preferably to the point of being eliminated."

That would make it easier to do cross-platform development for DB2, said Catterall. CheckFree, which sells e-business software and services, is also installing DB2 for Unix and wants its developers to be able to use the same tools across the board, he said.

Kathy Komer, president of the Chicago-based International DB2 Users Group, said she wants to see more complete integration between DB2 and related products, such as IBM's WebSphere application server. IBM has made some progress in that area, said Komer, who works as a database architect at insurer Aetna Inc. in Hartford, Conn. But, she added, "we don't believe they're done yet."

Jeff Jones, director of strategy for IBM's data management solutions, said the company is working to close the functionality gap between different DB2 releases. It already supports the ability to create repeatable processes that let users transfer SQL commands from one version of the database to another, he said.

In addition, an IBM spokeswoman said the next release of DB2 for OS/390 and z/OS will include a tool that can automatically summarize information, such as monthly sales totals. The feature is already included in DB2 for Unix and Windows.

IBM is also focused on more completely integrating its different software products with one another, including DB2, the spokeswoman added. ◗

On the Way

DUE OUT LATER THIS YEAR:

- Support within mainframe DB2 for more fully exploiting IBM's 64-bit zSeries systems
- Additional self-managing and system resource tuning capabilities

OTHER ENHANCEMENTS IN THE WORKS:

- Continued efforts to tighten integration with other IBM products, such as WebSphere
- The ability to reorganize data without having to take a database down
- Support for developing Microsoft .Net apps on DB2 for Windows

Microsoft Trial Remedy Phase Closes With Dramatic E-Mail

Suggests retaliation against PC makers supporting Linux

BY PATRICK THIBODEAU
WASHINGTON

Just three months after Microsoft trial Judge Thomas Penfield Jackson ruled that Microsoft Corp. "placed an oppressive thumb on the scale of competitive fortune," a top Microsoft executive sent a memo to Bill Gates and other officials recommending "underground" retaliatory actions against PC makers developing Linux-compatible devices.

In the August 2000 memo, Joachim Kempin, who headed original equipment maker relations for Microsoft at the time, complained that Intel Corp. was encouraging employees at large PC makers to support Linux and fund devices that would work well with the operating system.

Kempin said that to "play this the hard way" would "get more attention then we need." Instead, he concluded that Microsoft should "work underground with the clear understanding to promote and advantage guys with less market share without declaring that to be our strategy. I would further try to restrict source-code deliveries where possible and be less gracious when interpreting agreements — again without being obvious about it."

A Microsoft spokesman dismissed the memo as "random thoughts" that were never acted upon. Also, in a deposition, CEO Steve Ballmer characterized the memo's author as "prone to hyperbole."

CASE HISTORY

For complete *Computerworld* coverage of the Microsoft antitrust trial, visit:

QuickLink: s1100
www.computerworld.com

Memo in Limbo

The memorandum was probably the most dramatic piece of e-mail evidence the nine nonsettling states produced in the remedy phase, and they had planned to use it to strengthen their legal arguments that stronger anti-retaliatory provisions are needed in the final remedy.

But the memo is in procedural limbo. Judge Colleen Kollar-Kotelly is clearly aware of it but hasn't officially admitted it into the record. She has been very cautious about what does get entered. "This judge is a stickler for procedure," said Bob Lande, an antitrust professor at the University of Baltimore Law School.

Throughout the trial, Kollar-Kotelly has consistently ruled in favor of Microsoft on many procedural motions. But in court last week, she was a changed person. For the first time, she challenged both sides on a range of legal issues in an effort to sort out legal positions. Her questions seemed evenhanded.

In particular, she zeroed in on the key issue of the case of whether the Court of Appeals' decision finding that Microsoft had illegally maintained its monopoly opened the door for the range of remedies affecting handhelds, set-top boxes, server operating systems and Web services.

Kollar-Kotelly wouldn't tip her hand but isn't ruling out the possibility of a broader remedy and discussed in court whether these other technologies "are now in need of protection." Both sides argued their points before the only person who can answer that question. ◗

What's Next

CLOSING ARGUMENTS: Both sides won't return to court until June 19 for closing arguments.

DECISION: Late summer or early fall.

IBM Works on Marketing Challenges

IBM took over the top spot in the overall database market last year, according to sales data released this month by Stamford, Conn.-based Gartner Inc. But attendees at the DB2 conference said IBM has to work harder on marketing if it wants to make more inroads with Unix and Windows users.

"They still have work to do in building mind share in the Unix [database] market," said Robert Catterall, director of strategic technology for the e-commerce division at CheckFree.

Database users tend to be conservative and generally stick with what they have, noted James Governor, an analyst at Nashua, N.H.-based Illuminata Inc. IBM has increased its marketing efforts for the Unix and Windows versions of DB2, Governor said. But he added that the database still hasn't penetrated Oracle Corp.'s installed base of users as quickly as IBM officials would like.

Kathy Komer, president of the International DB2 Users Group, said IBM in the past was more comfortable dealing with the largest companies. But it's learning how to sell to a wider range of users, she added.

An IBM spokeswoman said the company is working to address the awareness issue in the Unix and Windows markets through a new marketing campaign designed to highlight those versions of DB2. - *Marc L. Songini*

T+1 Compliance May Need Kick-Start From Regulators

Meeting 2005 next-day trade processing goal could cost industry $8 billion

BY LUCAS MEARIAN

THE FINANCIAL services industry will spend $8 billion over the next four years — or $2 billion to $4 billion more than it collectively spent on the Y2k problem — in order to clear trades in a single day (T+1) vs. the current three-day cycle, according to the Securities Industry Association (SIA).

At the SIA's annual operations conference, in Palm Desert, Calif., earlier this month, some bankers and brokers said that while they don't expect their firms to be T+1 ready until 2005, many question the business case for moving to straight-through processing (STP) of trades.

The challenges involved in preparing for T+1 and STP are spurring some organizations to consider spending money now to upgrade computer systems and integrate databases and back- and front-end systems.

One company that's moving ahead on the T+1 front is A.G. Edwards & Sons Inc. in St. Louis, which is planning to change out all of its core processing systems. According to Gregory Vitt, who works in the firm's information processing unit, the company is currently evaluating a group of vendors to outsource its processing systems to. The firm currently handles processing in-house.

"The cost [to move to STP or real-time processing] is going to be big," said Vitt, who was unable to quantify the investment needed but estimated that the project would take two years to complete.

Still, IT managers will be hard-pressed early in their T+1 initiatives to squeeze money from senior management to upgrade systems and install middleware to achieve STP because the return on investment won't be immediately apparent, said SIA Executive Vice President Donald Kittell.

In order to get brokerages moving on T+1 initiatives, the industry either needs a mandate, such as an SIA member vote, or compliance deadlines from regulators such as the Securities and Exchange Commission, said Kittell. "We need urgency," he added.

Chris Sandel, vice president of execution and clearance services at New York-based Fleet Securities Inc.'s U.S. clearing division, agreed that SEC intervention will be needed.

"Back ends and front ends are out of sync. This will definitely cause another round of consolidations in this industry, because not everyone will be able to afford it," Sandel said.

Another issue confronting financial services firms in moving to STP or T+1 is the changeover to a new standard electronic messaging format dictated by the Society of Worldwide Interbank Financial Telecommunications (SWIFT), which has set a Nov. 16 deadline for the shift.

SWIFT is a Belgium-based international banking cooperative that created a messaging service used by more than 7,000 financial institutions for overnight payment clearance.

Achieving Efficiencies

T+1 and STP will require systems automation to achieve the speeds needed to clear trades in a single day or on the same day. A standard messaging format would allow front-end and back-end systems to communicate efficiently.

Banks and brokerages currently use a proprietary messaging format, the current SWIFT message format or a combination of both. The result: Data inputting isn't consistent, according to Francis Ramacle, head of SWIFT's securities industry division.

Ramacle said he expects most of the Global 1,000 brokerages and custodial banks to be in compliance by the November deadline, but he and others are concerned that many smaller firms will still be using old formats.

In order to move toward STP, Deutsche Bank AG is developing an application in conjunction with Antwerp, Belgium-based Capco, a financial services consulting firm, that will convert brokers' trade messages into SWIFT's new format. Those trade messages can then be processed by Deutsche Bank's back-end systems and clearinghouses, according to Genevy Dimitrion, vice president of product development at the Frankfurt-based bank.

MESSAGING MUDDLE

To learn about how a few banks and brokerages have complied with SWIFT's messaging format, visit our Web site.

QuickLink: 29867
www.computerworld.com

StarOffice 6.0 Opens Sun's Price Contest With Microsoft

Savings aimed at luring customers from Office XP

BY TODD R. WEISS

The price gap between Microsoft Office XP and Sun StarOffice 6.0 is substantial, but is it enough of a motivator for users to jump ship to StarOffice?

Sun Microsystems Inc. is betting that the savings will lead some companies to move away from Office XP toward StarOffice 6.0 in their search for comparable features at lower costs. Microsoft Corp. discounts such theories, arguing that users won't want less functionality because it would ultimately reduce worker productivity and cost more money overall.

Based on price alone, the savings are impressive. StarOffice 6.0 retails for $76 per copy, and each copy can be used on up to five PCs. Microsoft Office XP Standard, which has application features comparable to StarOffice, retails for $479, and each copy can be used on only one PC.

Microsoft's volume licensing program can cut the cost of the XP Standard version to $297 to $377 per copy, according to Stamford, Conn.-based research firm Gartner Inc. StarOffice 6.0 prices drop to $50 per copy for 150 or more copies and to $25 each for more than 10,000 copies.

The savings are important to Eric Lesatz, vice president of information systems at A.B. Watley Group Inc. The New York-based financial services firm has rolled out StarOffice 6.0 to 25 of its 75 users and has replaced Microsoft Office 97 on about 10 machines. Workers see no appreciable differences when using the suites, according to Lesatz.

But the cost gap is a huge factor, he said, and will likely mean that Microsoft's suite will be available only to users at his company who absolutely require it. "For 98% of the people [here at A.B. Watley], I would say [StarOffice is] going to do the job," he said.

Compatibility vs. Savings

Although the savings would be nice, Jon Dell'Antonia, vice president of MIS at clothing maker OshKosh B'Gosh Inc. in Oshkosh, Wis., said he wouldn't switch over because Microsoft Office products are what his customers and vendors are using. File compatibility with other products would be a concern, he said, and avoiding the potential problems is worth the added cost of staying with Microsoft Office.

Price Comparison

StarOffice 6.0
- $76 retail
- 150 to 10,000 copies, $50 each
- More than 10,000 copies, $25 each

Microsoft Office XP Standard
- $479 retail

Microsoft Office XP volume licensing
- $297-$377 per copy

"We've already signed the licensing agreement to do it because we know the handwriting is on the wall," Dell'Antonia said.

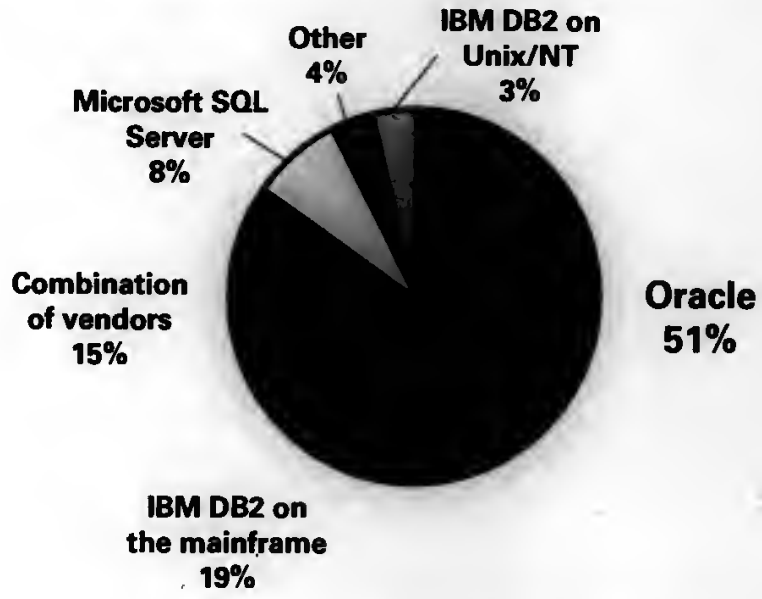
Analyst Gordon Haff at Illuminata Inc. in Nashua, N.H., said StarOffice has a chance of taking on Office XP because of anger from customers who are tired of paying high licensing fees. "Microsoft seems determined to see how much money it can squeeze out of buyers, but in doing so, they're opening up an opportunity for somebody else to come in," Haff said.

Microsoft spokeswoman Nicole von Kaenel said users will continue to see a huge difference in value between the Microsoft and Sun suites, despite the price gaps.

"There's a huge distinction between value and price," she said.

Oracle #1

with the Fortune 100™



More than half of the Fortune 100 run Oracle as their primary database.

ORACLE

Source: The FactPoint Group, April 2002

oracle.com/ad
or call 1.800.633.1062

Copyright © 2002 Oracle Corporation. All rights reserved. Oracle is a registered trademark of Oracle Corporation.
Other names may be trademarks of their respective owners.

BRIEFS

CA Board Sets New Operating Policies

Computer Associates International Inc. said its board adopted a new set of operating policies and procedures that included naming a lead independent director and establishing guidelines for doing annual reviews of the software vendor's CEO. The normal size of Islandia, N.Y.-based CA's board was set at 12 directors, with only three of them from inside the company.

IBM CEO Palmisano Mum on Possible Cuts

Samuel Palmisano, IBM's new CEO, said during a meeting with financial analysts that the company is taking action to stem losses of its PC and disk drive units. But he didn't directly address questions about reports that IBM is preparing to lay off up to 3% of its 320,000 employees (QuickLink: 29660). "You'll hear more about what we're doing [to reduce costs]," Palmisano said.

Dell Q1 Results Similar To Year-Earlier Figures

Dell Computer Corp. reported net income of $457 million for its first quarter ended May 3, down 1% from the year-earlier level of $462 million. Revenue was up slightly at $8.07 billion, compared with $8.03 billion in last year's first quarter. The results were above Dell's earlier projections, and the company said second-quarter revenue could increase by up to 8% year over year.

Short Takes

New York-based COLGATE-PALMOLIVE CO., which has used SUN MICROSYSTEMS INC.'s servers, said it's standardizing its systems on IBM hardware. . . . A U.S. District Court judge denied a request by MICROSOFT CORP. to reconsider a ruling that let San Diego-based LINDOWS.COM INC. sell an operating system under the name Lindows.

Sears, Lands' End Prep For Tech Challenges

Systems need little integration, but analysts predict more work in the future

BY CAROL SLIWA

Well known for its catalog and online operations, Lands' End Inc. will now learn the fine points of making sure its fleece-lined jackets, turtlenecks and other apparel lines are well stocked in 870 retail stores throughout the U.S.

When Sears, Roebuck and Co. last week announced its intention to buy the Dodgeville, Wis.-based retailer for $1.9 billion, Lands' End not only gained access to a nationwide chain of stores. It also garnered new chances for systems integration and different sorts of IT challenges associated with planning and distributing crates of inventory to retail stores, rather than picking, packing and shipping items for individual customers.

Sears CIO Jerry Miller said a team from both companies, including IT personnel, will look for opportunities to integrate systems, share best practices and create links to each other's Web sites. But since Lands' End will operate separately as a wholly owned subsidiary, Hoffman Estates, Ill.-based Sears will deal with its new acquisition in much the same way it deals with other vendors, minimizing the need for extensive systems integration work, Miller said.

"It makes it very easy, very simple and very quick," he said.

But some analysts predicted that the two retailers eventually will want to do more systems integration work to make sure the merger goes well. Geri Spieler, an analyst at Stamford, Conn.-based Gartner Inc., said they will need to integrate inventory, replenishment, forecasting and merchandising systems to maintain Lands' End's good reputation.

"There's a higher expectation of performance," she said, adding that Sears won't be able to deal with Lands' End in the same way it deals with other suppliers.

James Dion, president of Dionco Inc., a Chicago retail consultancy, said the retailers will want to make sure they're carrying the right amount of inventory and predicting demand properly, potentially necessitating some heavy integration work.

"If Lands' End orders too much and Sears can't take it, what does Lands' End do with it?" Dion said. "They are going to have their catalog and Web operation, but there is no other kind of safety valve that the ordinary arm's-length vendor would have."

To anticipate Sears' needs, Lands' End will want to get access to point-of-sale information to spot sales trends and better prepare for resupplying goods, he said.

"Buying in retail is very different than buying for catalog," said Dion, who formerly worked in buying at Sears.

Gartner analyst Adam Sarner said Sears and Lands' End will want to find ways to share customer data between their online and in-store channels in order to spot their most profitable customers and do better supply chain planning.

Chris Merritt, an analyst at Atlanta-based Kurt Salmon Associates, a retail consultancy that has worked with both Sears and Lands' End, said there could be a "real business risk" associated with Sears trying to absorb Lands' End.

But Merritt said he expects Sears' Web site and catalog operations to eventually wind up on Lands' End innovative infrastructure. Already, the retailers have announced that Lands' End CEO David Dyer will assume responsibility for Sears' existing customer-direct business, which includes its Web site.

Merritt said the biggest IT hurdle associated with the merger will lie in Lands' End's ability to direct its inventory to Sears' stores.

"Lands' End is a world-class operation," Merritt said. "They have the core infrastructure in place. It's just a lot of work to add a retail product flow to the current infrastructure."

Plans call for Lands' End apparel to be available at some Sears stores this fall, with the full rollout by fall 2003.

"We can really help each other, and we can get this up and running very quickly," said Miller. "It's not quite as complicated as one might think."

AT A GLANCE

Teamwork

An integration team from Sears and Lands' End will look for opportunities to integrate systems and share best practices.

- Both retailers have a mixture of home-grown and packaged systems.
- Both use the same Mobus reporting system.
- Lands' End will take responsibility for Sears' Web site and catalog operations.

Sears CIO: IT Departments to Remain Separate

Jerry Miller, CIO at Sears, last week discussed the IT implications of his company's purchase of Lands' End with *Computerworld* senior editor Carol Sliwa. Interview excerpts follow.

Will Sears and Lands' End IT departments fuse?

We're going to operate this as a wholly owned subsidiary. So they're going to have their IT department.

MILLER: "This is not a cost-reduction acquisition."

Will you connect electronic data interchange systems?

Yes.

Will the IT staff at Lands' End be responsible for running the systems needed to distribute merchandise to your stores? Where we can help, we will. That primarily will be a Lands' End challenge, and they've got the management team to handle that.

From an IT perspective, what are the greatest challenges that your two companies face going forward?

Primarily to identify where there are opportunities to integrate and to leverage, to make sure that we make the right decisions.

I think we need to be careful here. We don't need to rush to judgment. . . . We didn't purchase them to try to get some synergy of scale. This is not a cost-reduction acquisition.

Will IT people be assigned to find potential areas of synergy?

Oh yeah. We're going to have an integration team made up of Lands' End people as well as Sears people, and we will look for areas of opportunity to integrate and share best practices. But the last thing we want to do is upset the apple cart here.

MORE FROM MILLER

Read the complete text of this interview with Sears' CIO at our Web site: QuickLink: 29662 www.computerworld.com

Attention IT Managers!

Learn how to improve the performance of your e-business systems.

KEYNOTE
The Internet Performance Authority

Dear IT Manager,

Keynote Systems is bringing together our largest customers, our most important partners, and leading analysts to define the future of performance management.

And we want you to be a part of it.

Please accept my personal invitation to attend the 2002 Keynote Global Internet Performance Conference June 9-11 in San Francisco. At this two-day conference, you will:

*Learn best practices for managing end-to-end performance from the world's leading provider of performance services

*Hear how companies like Qwest, UPS, and Fox Sports News are using Keynote services to manage their e-business infrastructure without the high cost of software

*Get exclusive discounts on five new services that can help you identify, diagnose, and resolve problems faster

*Learn strategies for success from special guest speaker Geoffrey Moore, author of *Crossing the Chasm*

We'll also be announcing our new Application Performance Management (APM) strategy, and demonstrating how you can correlate and integrate Keynote's industry-standard measurement data into your existing passive monitoring, system monitoring, and enterprise management systems.

Today, over 2,600 companies rely on Keynote's performance management services to assure their Internet presence and protect their online revenue.

Join us June 9-11, and find out what we can do for you.

Umang Gupta, Chairman and CEO
Keynote Systems

P.S. **Bring a colleague for free!** Sign up today to take advantage of our special **2-for-1 registration**. For details, go to www.gipc2002.com/2for1.

Business Continuity Plans Embrace Networks, People

Companies shore up disaster recovery in response to business needs, terror threat

BY JAIKUMAR VIJAYAN
CHICAGO

COMPANIES ARE broadening their business continuity plans in response to business trends and to the events of Sept. 11, said analysts at a Gartner Inc. information security conference last week.

On the business front, the trend toward zero-latency networks, through which corporations can access and act on real-time business data, presents new risks to companies from a business continuity and disaster recovery standpoint.

The risks include those posed by insecure external service providers, data links to third parties, software vulnerabilities and human error.

Problems in any of these areas could seriously disrupt a network that needs to be on all the time and therefore have to be factored into disaster recovery and business continuity plans, said Roberta Witty, an analyst at Stamford, Conn.-based Gartner.

Know Thyself

Companies must understand their external links, the consequences of failure of any of these links and the contingencies to deal with such failures. In terms of architecture, it might mean looking at what kind of load-balancing and high-availability technologies are in place at a corporation, Witty said.

"This is not just about having [an application] that you bring up in recovery mode.... You are talking about having a production environment up and running all the time, whether it is in one location or more," she said.

Meanwhile, formerly asset-centric business continuity plans are broadening to include people, processes and work spaces, especially after Sept. 11, Witty added. New planning scenarios include loss of life, key decision-makers and communications capabilities, she said.

For instance, Aetna Inc. in Hartford, Conn., has broadened the scope of its disaster planning since Sept. 11 to include people and processes, said Kurt Bahrs, a disaster recovery specialist at Aetna.

Although the insurance company has two data centers in the Hartford area, it centralized most operations in one of the facilities about five years ago. Now Aetna is again dispersing staff between the facilities as a business continuity measure.

On the technology front, Aetna has already taken steps to ensure business continuity. All third parties linking into the company's Hartford network, for instance, must have fully redundant connections. In some cases, the Hartford network provides the redundancy at cost to the third party to ensure disaster tolerance, said Bahrs.

New York-based Cadwalader, Wickersham & Taft, whose offices had to be evacuated following the Sept. 11 attacks, has also expanded its disaster plans.

The law firm recently installed a laser-based communicator for replicating data between two of its facilities. Now instead of having to restart tape backups at a service provider location, the company is able to do so much more quickly from its own facility.

"It took us about a day to recover [from tape]. That's not good enough any longer," said Greta Ostrovitz, director of IT at the firm.

Cadwalader, Wickersham & Taft is also looking at building similar disaster tolerance into other aspects of its business, she said. For example, the company has direct electronic links with several of its clients around which it plans to build greater redundancy.

Recovery Advice

What to focus on when business continuity plans are limited.

CRISIS MANAGEMENT PLAN for ensuring safety of employees, continuity of decision-making and view from outside world

ASSET LIST and key supplier contact information

SECURE, off-site backup storage

SPENDING on most critical business processes

WORK-AT-HOME PROGRAMS for work space recovery

ARTHUR TARTAKOW INC. STAMFORD, CONN.

Tech Consortium Created to Improve Software Reliability

$30M intended to spark debate, help develop standards

BY DAN VERTON
WASHINGTON

A group of 18 organizations from all sectors of the economy has teamed with Carnegie Mellon University in Pittsburgh to form a technology consortium dedicated to improving the reliability and security of commercial software.

Armed with $30 million in seed money from grants from private institutions, the new Sustainable Computing Consortium (SCC) will work to initiate public policy debates and create new standards and techniques for developing more reliable software.

In addition to the university, SCC founders include Microsoft Corp., Oracle Corp., American International Group Inc. (AIG), Cisco Systems Inc., Mellon Financial Corp. and NASA.

"Software systems have become the critical infrastructure of our nation and economy. Unreliable software has profound consequences," said William Guttman, director of the Pittsburgh-based SCC. He added that the loss of a single cellular telephone network node due to a software failure could cost a company $18,000 or more per minute.

In fact, statistics recently released by the Washington-based National Research Council show that U.S. companies spent $175 billion last year to repair damages caused by software defects and $12.3 billion to repair systems affected by computer viruses. SCC officials said those costs are likely to rise this year.

Taking Action

However, the software industry is still in its infancy when it comes to taking action on reliability and security issues, said Jim Morris, dean of the school of computer science at Carnegie Mellon.

Steve Perkins, senior vice president of Oracle's public-sector and homeland security division, agreed. "Software, as an industry, is pretty immature," Perkins said. "We lack the metrics, the standards and the discipline, [and] these kinds of capabilities cannot be architected [into software] after the fact."

"We now have all of the players who can address these problems," said Morris. He added that the SCC will be actively recruiting other companies to take part.

However, questions were raised during a press briefing regarding the incentives that exist for software vendors to improve the reliability and security of their systems. Many companies, such as Oracle, use the unique security features of their software as selling points and marketing tools against competitors.

Ty Sagalow, chief operating officer at New York-based AIG's eBusiness Risk Solutions group, one of the largest U.S. insurance companies that offers security risk insurance, said the insurance industry will play an important role in promoting "positive behaviors" in software developers.

However, Sagalow added, the SCC will be key in helping the industry quantify cyber-risks. "We must act now," he said. "There is a business need to create a cycle of risk management."

Guttman said the consortium hopes to define specific challenges and a plan for developing technological measurements within the next year. He declined to elaborate on specific deliverables and timetables.

Reliable Path

The charter for the SCC says it must do the following:

FOSTER the development of standards to reduce software defects.

QUANTIFY and reduce the risks that software poses to critical infrastructures.

RALLY businesses, developers, and public policy decision-makers to tackle the technical, legal and legislative issues surrounding reliable software.

CONDUCT independent research and measurement, and develop best practices for software quality and dependability.

Business Continuity Plans Embrace Networks, People

Companies shore up disaster recovery in response to business needs, terror threat

BY JAIKUMAR VIJAYAN
CHICAGO

COMPANIES ARE broadening their business continuity plans in response to business trends and to the events of Sept. 11, said analysts at a Gartner Inc. information security conference last week.

On the business front, the trend toward zero-latency networks, through which corporations can access and act on real-time business data, presents new risks to companies from a business continuity and disaster recovery standpoint.

The risks include those posed by insecure external service providers, data links to third parties, software vulnerabilities and human error.

Problems in any of these areas could seriously disrupt a network that needs to be on all the time and therefore have to be factored into disaster recovery and business continuity plans, said Roberta Witty, an analyst at Stamford, Conn.-based Gartner.

Know Thyself

Companies must understand their external links, the consequences of failure of any of these links and the contingencies to deal with such failures. In terms of architecture, it might mean looking at what kind of load-balancing and high-availability technologies are in place at a corporation, Witty said.

"This is not just about having [an application] that you bring up in recovery mode.... You are talking about having a production environment up and running all the time, whether it is in one location or more," she said.

Meanwhile, formerly asset-centric business continuity plans are broadening to include people, processes and work spaces, especially after Sept. 11, Witty added. New planning scenarios include loss of life, key decision-makers and communications capabilities, she said.

For instance, Aetna Inc. in Hartford, Conn., has broadened the scope of its disaster planning since Sept. 11 to include people and processes, said Kurt Bahrs, a disaster recovery specialist at Aetna.

Although the insurance company has two data centers in the Hartford area, it centralized most operations in one of the facilities about five years ago. Now Aetna is again dispersing staff between the facilities as a business continuity measure.

On the technology front, Aetna has already taken steps to ensure business continuity. All third parties linking into the company's Hartford network, for instance, must have fully redundant connections. In some cases, the Hartford network provides the redundancy at cost to the third party to ensure disaster tolerance, said Bahrs.

New York-based Cadwalader, Wickersham & Taft, whose offices had to be evacuated following the Sept. 11 attacks, has also expanded its disaster plans.

The law firm recently installed a laser-based communicator for replicating data between two of its facilities. Now instead of having to restart tape backups at a service provider location, the company is able to do so much more quickly from its own facility.

"It took us about a day to recover [from tape]. That's not good enough any longer," said Greta Ostrovitz, director of IT at the firm.

Cadwalader, Wickersham & Taft is also looking at building similar disaster tolerance into other aspects of its business, she said. For example, the company has direct electronic links with several of its clients around which it plans to build greater redundancy. ▶

Recovery Advice

What to focus on when business continuity plans are limited.

CRISIS MANAGEMENT PLAN for ensuring safety of employees, continuity of decision-making and view from outside world

ASSET LIST and key supplier contact information

SECURE off-site backup storage

SPENDING on most critical business processes

WORK-AT-HOME PROGRAMS for work space recovery

SOURCE: GARTNER INC., STAMFORD, CONN.

Tech Consortium Created to Improve Software Reliability

$30M intended to spark debate, help develop standards

BY DAN VERTON
WASHINGTON

A group of 18 organizations from all sectors of the economy has teamed with Carnegie Mellon University in Pittsburgh to form a technology consortium dedicated to improving the reliability and security of commercial software.

Armed with $30 million in seed money from grants from private institutions, the new Sustainable Computing Consortium (SCC) will work to initiate public policy debates and create new standards and techniques for developing more reliable software.

In addition to the university, SCC founders include Microsoft Corp., Oracle Corp., American International Group Inc. (AIG), Cisco Systems Inc., Mellon Financial Corp. and NASA.

"Software systems have become the critical infrastructure of our nation and economy. Unreliable software has profound consequences," said William Guttman, director of the Pittsburgh-based SCC. He added that the loss of a single cellular telephone network node due to a software failure could cost a company $18,000 or more per minute.

In fact, statistics recently released by the Washington-based National Research Council show that U.S. companies spent $175 billion last year to repair damages caused by software defects and $12.3 billion to repair systems affected by computer viruses. SCC officials said those costs are likely to rise this year.

Taking Action

However, the software industry is still in its infancy when it comes to taking action on reliability and security issues, said Jim Morris, dean of the school of computer science at Carnegie Mellon.

Steve Perkins, senior vice president of Oracle's public-sector and homeland security division, agreed. "Software, as an industry, is pretty immature," Perkins said. "We lack the metrics, the standards and the discipline, [and] these kinds of capabilities cannot be architected [into software] after the fact."

"We now have all of the players who can address these problems," said Morris. He added that the SCC will be actively recruiting other companies to take part.

However, questions were raised during a press briefing regarding the incentives that exist for software vendors to improve the reliability and security of their systems. Many companies, such as Oracle, use the unique security features of their software as selling points and marketing tools against competitors.

Ty Sagalow, chief operating officer at New York-based AIG's eBusiness Risk Solutions group, one of the largest U.S. insurance companies that offers security risk insurance, said the insurance industry will play an important role in promoting "positive behaviors" in software developers.

However, Sagalow added, the SCC will be key in helping the industry quantify cyber-risks. "We must act now," he said. "There is a business need to create a cycle of risk management."

Guttman said the consortium hopes to define specific challenges and a plan for developing technological measurements within the next year. He declined to elaborate on specific deliverables and timetables. ▶

Reliable Path

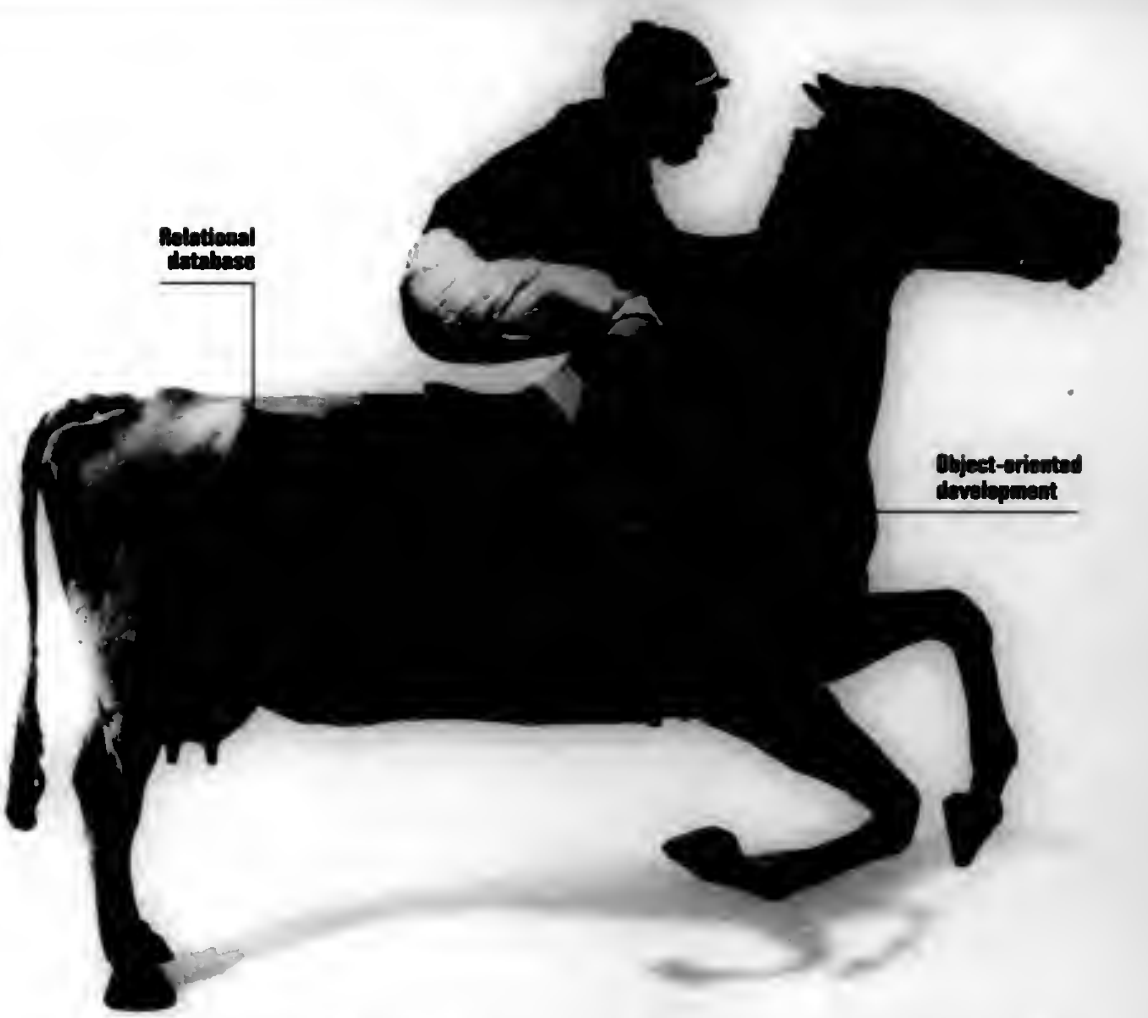
The charter for the SCC says it must do the following:

FOSTER the development of standards to reduce software defects.

QUANTIFY and reduce the risks that software poses to critical infrastructures.

RALLY businesses, developers, and public policy decision-makers to tackle the technical, legal and legislative issues surrounding reliable software.

CONDUCT independent research and measurement, and develop best practices for software quality and dependability.



If your back-end database isn't a good match for your front-end development, you need a new database. Caché, the high-performance database from InterSystems, is a powerful fusion of today's mainstream technologies: objects and SQL.

Unlike Oracle and other relational databases, Caché takes advantage of its efficient multidimensional data engine to implement an advanced object model. It doesn't try to hide a cumbersome relational engine beneath object-like wrappers.

Every Caché object is compatible with Java, C++, ActiveX, and other rapid development technologies. And thanks to Caché's "Unified Data Architecture," every object class is instantly accessible as tables via ODBC and JDBC.

With no mapping or middleware. That means no wasted development time. And no extra processing at run time. So not only will your applications be quick to build or adapt, they will run faster too.

Get The Right Back-End For Your Front-End.

InterSystems
CACHÉ
Make Applications Faster

Download Caché for free or request it on CD at www.InterSystems.com/match6

© 2001 InterSystems Corporation. All rights reserved. InterSystems Caché is a registered trademark of InterSystems Corporation.

Cisco Makes Its Routing Software More Resilient

BY MICHAEL MEEHAN

A week after Cisco Systems Inc. CEO John Chambers trumpeted the importance of network resiliency at the Networld+Interop conference, the company announced a major upgrade of its routing software that's aimed at reducing the number of network failures.

Cisco said the network resiliency features that are being built into the new release of its Internetwork Operating System (IOS) software include protections to guard against the loss of any data packets, the ability to circumvent failed devices and faster rerouting sequences when network problems occur.

"It's a definite step forward in terms of resiliency," said Joe Fusco, product manager for private IP network services at Infonet Services Corp., a Cisco user in El Segundo, Calif. "Right now, it's a matter of making sure we feel it's ready for deployment, but the new features certainly interest us."

Fusco said he's particularly intrigued by the zero packet loss features. "If you can get from 99.3% throughput levels to 100%, that's a lot of packets," he said. "We move millions of packets a day."

Tim Smith, an analyst at Gartner Inc. in Stamford, Conn., said the Cisco IOS release "represents another step in the maturation" of IP. Surer handling of data packets and consistent uptime are critical for moving voice, video and storage data across corporate networks, he said.

At the N+I conference in Las Vegas, Mike Volpi, a senior vice president in Cisco's enterprise group, asserted that a more resilient backbone would allow IP-based networks to handle increased traffic as well as more complex kinds of data.

For example, Volpi said storage installations are "an absolute shoo-in" to run on IP if the networking technology can be made as robust and reliable as Cisco thinks.

Cisco's IOS software can also work with hardware from other vendors. However, "the most benefit from these capabilities will still be felt when it's all Cisco working on the back end," Smith said. "There's some standardization that needs to happen to make this a better fit for enterprises with heterogeneous networks."

The first wave of resiliency features will become available next month, Cisco said. In the second half of the year, the company plans to add a protocol that lets users operate a standby wide-area network connection even when the primary link is in use, plus the ability to rebuild encrypted virtual private network tunnels when a primary router fails.

Smith said demand for such services is high, leaving Cisco with little leeway for error. "There is absolutely no room in the market for missed dates [or] for rolling out stuff that's not rock-solid," he said.

Fusco noted that early adopters, such as Infonet, will likely spend a few months testing how resilient the new features are before they put them into use. "This is new stuff, and we want to see how resilient it really is before we put too much trust in it," he said.

Continued from page 1

LAN Security

numerous federal agencies and commercial customers, detected the nonsecure wireless LAN at the Defense Information Systems Agency (DISA) on May 10.

While parked across the street from DISA's headquarters, O'Ferrell was able to view the Service Set Identifier (SSID) numbers of access points and numerous IP addresses. Using a standard 802.11b wireless LAN card attached to his laptop computer and AP detection software from San Diego-based NetStumbler.com, he was able to scan the network in less than half an hour.

Lackadaisical Safeguards

O'Ferrell, who didn't attempt to enter the network, also determined that DISA had failed to protect the system with the most basic form of 802.11b security, the Wired Equivalent Privacy (WEP) protocol.

The lack of encryption and other protections could make it possible for an intruder to enter the security camera system by launching a denial-of-service attack against a specific access point, allowing the intruder to "spoof" that access point. That would enable him to view what security personnel see with the closed-circuit TV camera.

The wireless LAN allows security personnel to remotely pan, tilt or zoom the cameras, according to Betsy Flood, a DISA spokeswoman.

That information could make it easier for intruders to conduct a physical penetration of the compound, which houses the Defense Department's Global Network Operations Center, Computer Emergency Response Team and Network Security Operations Center.

O'Ferrell expressed concern that DISA had taken what he considered to be a casual approach to wireless networks operating at its headquarters.

Flood confirmed that DISA had operated a closed-circuit TV security camera system for about 45 days without encryption while it was being tested. During that time, she said, anyone sniffing the nonencrypted system could indeed "see what we see on our video monitors, i.e., the parking lot, the front gate, the fence line, etc."

Flood, who said on May 16 that the agency planned to encrypt the network by the end of that day, also acknowledged that one of the cameras was broadcasting the "AP-BLDG 12" SSID, an access point SSID for one of the cameras in the compound. She said DISA is working with its vendors to change settings to make the system more secure.

Flood said DISA's closed-circuit TV wireless LAN would be encrypted with 64-bit WEP and a trademarked 128-bit encryption algorithm from Bedford, Mass.-based RSA Security Inc. called RC4. She added that it would also be protected by a control table for Media Access Control addresses, the unique identifier for each computer on a network.

Flood emphasized that the wireless LAN security camera system was separate from other DISA networks.

O'Ferrell said the SSID of the access point he detected had an obvious name; AP-BLDG 12 easily correlated with the building number painted on the DISA headquarters. Such information could help an intruder "launch a 10-second [denial-of-service attack] against the DISA [access point], knock it out, set up their own [access point] with the SSID, and DISA would never know," he said.

O'Ferrell said it's both prudent and easy to turn off an SSID.

Joe Weiss, vice president of the network application division at Aeronautical Radio Inc. in Annapolis, Md., which provides wireless communications services to the airline industry, said it's a good idea for DISA to encrypt traffic to and from closed-circuit TV cameras running over an 802.11b wireless system. Operating them in the open would make it easy for non-DISA personnel to take control of the system, he said.

Earlier this year, Weiss said, an 802.11b wireless camera installed by one airline at Dallas/Fort Worth International Airport was inadvertently controlled by personnel at another airline.

Jim Lewis, a technology and public policy analyst at the Center for Strategic and International Studies in Washington, said DISA's security lapse illustrates the problems that the proliferation of wireless systems and devices poses for government and commercial organizations.

"This could happen to anyone, because people are deploying systems before thinking about security," he said.

Reporter Dan Verton contributed to this story.

Stop the Sniffers

Wireless LAN detection, sniffing and hacking tools have become more sophisticated over the past year and are widely available on the Web. To protect their wireless networks, enterprises should:

Disable the Service Set Identifier on all access points and wireless devices. If an SSID is broadcast in the clear, snoopers could set an access point with the same SSID and route network traffic through their device.

Encrypt all IP addresses. Broadcasting IPs in the clear makes it easy for an attacker to determine network topology.

Encrypt all sensitive traffic using the 128-bit Advanced Encryption Standard algorithm.

Sniff their own buildings. Increasingly, users are making end runs around IT and plugging an access point into the office LAN for convenience.

Check "war driving" bulletin boards such as *www.netstumbler.com* to see if their access points have been sniffed and identified.

Confine the signal to a building or corporate campus by using tuned, directional antennas in lieu of omnidirectional antennas that come with off-the-shelf access points.

Cisco Makes Its Routing Software More Resilient

BY MICHAEL MEEHAN

A week after Cisco Systems Inc. CEO John Chambers trumpeted the importance of network resiliency at the Networld+Interop conference, the company announced a major upgrade of its routing software that's aimed at reducing the number of network failures.

Cisco said the network resiliency features that are being built into the new release of its Internetwork Operating System (IOS) software include protections to guard against the loss of any data packets, the ability to circumvent failed devices and faster rerouting sequences when network problems occur.

"It's a definite step forward in terms of resiliency," said Joe Fusco, product manager for private IP network services at Infonet Services Corp., a Cisco user in El Segundo, Calif. "Right now, it's a matter of making sure we feel it's ready for deployment, but the new features certainly interest us."

Fusco said he's particularly intrigued by the zero packet loss features. "If you can get from 99.3% throughput levels to 100%, that's a lot of packets," he said. "We move millions of packets a day."

Tim Smith, an analyst at Gartner Inc. in Stamford, Conn., said the Cisco IOS release "represents another step in the maturation" of IP. Surer handling of data packets and consistent uptime are critical for moving voice, video and storage data across corporate networks, he said.

At the N+I conference in Las Vegas, Mike Volpi, a senior vice president in Cisco's enterprise group, asserted that a more resilient backbone would allow IP-based networks to handle increased traffic as well as more complex kinds of data.

For example, Volpi said storage installations are "an absolute shoo-in" to run oo IP if the networking technology can he made as robust and reliable as Cisco thinks.

Cisco's IOS software can also work with hardware from other vendors. However, "the most benefit from these capabilities will still he felt when it's all Cisco working oo the back end," Smith said. "There's some standardization that needs to happen to make this a better fit for enterprises with heterogeneous networks."

The first wave of resiliency features will become available next month, Cisco said. In the second half of the year, the company plans to add a protocol that lets users operate a standby wide-area network connection even when the primary link is in use, plus the ability to rebuild encrypted virtual private network tunnels when a primary router fails.

Smith said demand for such services is high, leaving Cisco with little leeway for error. "There is absolutely no room in the market for missed dates [or] for rolling out stuff that's not rock-solid," he said.

Fusco noted that early adopters, such as Infonet, will likely spend a few months testing how resilient the new features are before they put them into use. "This is new stuff, and we want to see how resilient it really is before we put too much trust in it," he said.

Continued from page 1

LAN Security

numerous federal agencies and commercial customers, detected the nonsecure wireless LAN at the Defense Information Systems Agency (DISA) on May 10.

While parked across the street from DISA's headquarters, O'Ferrell was able to view the Service Set Identifier (SSID) numbers of access points and numerous IP addresses. Using a standard 802.11b wireless LAN card attached to his laptop computer and AP detection software from San Diego-based NetStumbler.com, he was able to scan the network in less than half an hour.

Lackadaisical Safeguards

O'Ferrell, who didn't attempt to enter the network, also determined that DISA had failed to protect the system with the most basic form of 802.11b security, the Wired Equivalent Privacy (WEP) protocol.

The lack of encryption and other protections could make it possible for an intruder to enter the security camera system by launching a denial-of-service attack against a specific access point, allowing the intruder to "spoof" that access point. That would enable him to view what security personnel see with the closed-circuit TV camera.

The wireless LAN allows security personnel to remotely pan, tilt or zoom the cameras, according to Betsy Flood, a DISA spokeswoman.

That informatioo could make it easier for intruders to conduct a physical penetration of the compound, which houses the Defense Department's Global Network Operations Center, Computer Emergency Response Team and Network Security Operations Center.

O'Ferrell expressed concern that DISA had taken what he considered to he a casual approach to wireless networks operating at its headquarters.

Flood confirmed that DISA had operated a closed-circuit TV security camera system for about 45 days without encryption while it was being tested. During that time, she said, anyone sniffing the nonencrypted system could indeed "see what we see on our video monitors, i.e., the parking lot, the front gate, the fence line, etc."

Flood, who said on May 16 that the agency planned to encrypt the network by the end of that day, also acknowledged that one of the cameras was broadcasting the "AP-BLDG 12" SSID, an access point SSID for one of the cameras in the compound. She said DISA is working with its vendors to change settings to make the system more secure.

Flood said DISA's closed-circuit TV wireless LAN would he encrypted with 64-bit WEP and a trademarked 128-bit encryption algorithm from Bedford, Mass.-based RSA Security Inc. called RC4. She added that it would also be protected by a control table for Media Access Control addresses, the unique identifier for each computer on a network.

Flood emphasized that the wireless LAN security camera system was separate from other DISA networks.

O'Ferrell said the SSID of the access point he detected had an obvious name; AP-BLDG 12 easily correlated with the building number painted on the DISA headquarters. Such information could help an intruder "launch a 10-second [denial-of-service attack] against the DISA [access point], knock it out, set up their own [access point] with the SSID, and DISA would never know," he said.

O'Ferrell said it's both prudent and easy to turn off an SSID.

Joe Weiss, vice president of the network application division at Aeronautical Radio Inc. in Annapolis, Md., which provides wireless communications services to the airline industry, said it's a good idea for DISA to encrypt traffic to and from closed-circuit TV cameras running over an 802.11b wireless system. Operating them in the open would make it easy for non-DISA personnel to take control of the system, he said.

Earlier this year, Weiss said, an 802.11b wireless camera installed by one airline at Dallas/Fort Worth International Airport was inadvertently controlled by personnel at another airline.

Jim Lewis, a technology and public policy analyst at the Center for Strategic and International Studies in Washington, said DISA's security lapse illustrates the problems that the proliferation of wireless systems and devices poses for government and commercial organizations.

"This could happen to anyone, because people are deploying systems before thinking about security," he said.

Reporter Dan Verton contributed to this story.

greater than / *abbrev* **>**

You know just as good isn't good enough. Today's leading companies have to be greater than the competition by a wide margin. At Sprint, we've got the network, the people and the services that can help you build unequalled and sustainable competitive advantage.

An intelligent network

Advantage one: our network. It was built from the ground up as a unified whole. (No technological patchwork here.) That means we deliver unsurpassed reliability and interoperability, so you can leverage existing investments in systems and applications and migrate to our latest and greatest technology — like 3G mobile solutions for greater productivity — when you're ready. In fact, we're the only provider that owns and operates both its own nationwide wireless and wireline access to your critical data apps.

A network of intelligence

Advantage two: our people and services. We have over 2,200 technical and support professionals, including 1,500 trained engineers. Plus, we're an industry leader in on-staff Cisco Certified Technicians and Certified Security Specialists. So what are all these people doing? Answering your questions. Building your customized applications. And working to help ensure your systems are safe and secure.

Greater competitive advantage — another sign of an intelligent network and the people who make it work (for you).

For more ideas on building competitive advantage, access our library of white papers at **sprint.com/whitepapers/11** or call **1-877-519-1709.**

Copyright © Sprint 2002. All rights reserved.

BRIEFS

Sun to Add Patch Tool With Solaris 9

Sun Microsystems Inc. said it plans to include a Java-based software patch management tool as part of its Solaris 9 operating system, which is scheduled to be formally announced May 22 and become available next month. The Patch Manager utility will let users scan their systems for security vulnerabilities and automatically download available patches, according to Sun.

IBM Builds 1TB Tape, But Use Far Off

IBM said it has developed a prototype tape cartridge that can store 1TB of data, 10 times more than the largest cartridge it sells now. But the 1TB model isn't likely to be ready for production for three to four years because the prototype transfers data at just 15MB/sec., said IBM. Current tape cartridges have data-transfer rates of up to 200MB/sec.

State Department Gives IT Pact to CSC

Computer Sciences Corp. and a group of subcontractors that includes Microsoft Corp. and Oracle Corp. won an IT services contract from the U.S. Department of State. The contract covers services related to the agency's hardware, operating systems and applications. El Segundo, Calif.-based CSC said the deal could be worth up to $160 million over five years.

Airline Web Site Uses Orbitz Software

American Airlines Inc. said it's using reservation and booking software developed by online travel site Orbitz LLC in a new version of its Web site launched last month. Fort Worth, Texas-based American was one of the five airlines that initially funded Chicago-based Orbitz.

Continued from page 1

Navy Intranet

the program. Mike Hatcher, EDS's N/MCI director for Navy Operating Forces, warned that the current deployment schedule could put the future of the program at risk.

"We have agreed with [N/MCI director Rear Adm. Charles] Munns . . . that ruthlessly rolling seats is the only way for N/MCI to survive and prosper," wrote Hatcher. "Our present way of working . . . if left unchanged would spell an end to the N/MCI program by summertime."

The N/MCI program is designed to replace hundreds of disparate Navy and Marine Corps computer networks with a centrally managed setup operated by EDS.

A Scorched-Earth Rollout?

In addition to an initial 60,000 seats, the Pentagon on May 3 granted the Navy permission to purchase an additional 100,000 seats based on EDS's success in meeting the requirements of the initial test and evaluation phase.

Officials had hoped to have 135,000 seats deployed this year. However, the Hatcher e-mail warned the EDS N/MCI team that the current deployment rate would likely result in only 60,000 seats being operational by the end of the year, leaving the program open to criticism and political attacks that could put its future in jeopardy.

In fact, Hatcher referred to a meeting between Munns and Al Edmonds, president of EDS's government information solutions division, during which Edmonds reportedly characterized the new deployment plan as "a scorched-earth seat rollout."

Rick Rosenberg, EDS's program executive for N/MCI, downplayed the e-mail, calling it a "rallying cry for the troops" that used inappropriate language.

Part of the EDS/Navy "scorched-earth" deployment plan includes a directive to EDS installers to no longer wait for security certifications to make their way through the various bureaucratic layers of the Navy before beginning installation of N/MCI seats. Instead, EDS employees will now install N/MCI systems simultaneously while waiting for the Navy to issue final, signed Interim Authority to Operate letters. Any application that fails or is expected to fail security certification, or that doesn't run on Windows 2000, will be automatically installed on a kiosk separate from N/MCI, "no questions asked," according to Hatcher's e-mail.

Issues and Answers

These are the problems cited in internal memos dated April 25 and May 6, with responses from EDS and Navy spokesmen:

1. The current deployment schedule could result in failure of N/MCI by summer.
Navy Capt. Chris Christopher, deputy director for plans and oversight of the N/MCI program: "There have been a lot of distractions. It's been like a dog sled with all of the dogs running in different directions. But we have to roll out seats."

2. NAVAIR's Remote Access Service (RAS) isn't working.
Rick Rosenberg, EDS's program executive for N/MCI: "We had a RAS problem, but N/MCI remote access works. For NAVAIR, there's an additional functionality that has to be bolted on for calendaring and scheduling. However, RAS at NAVAIR is fixed."

3. Legacy applications aren't fully operational. This requires users to use a second desktop or a kiosk.
Christopher: "The legacy applications [challenge] is something the Navy did not understand when it started the N/MCI effort. We've since started a Navy application database task force. Kiosks are part of the transition."

4. Secure Web site access isn't operational.
Rosenberg: "Secure Web access is a Navy policy issue that needs to be resolved."

5. The ability of the Network Operations Center help desk to solve problems in a timely manner is a major problem.
Rosenberg: "A limited number of users were impacted." The problems, mostly a matter of training, have since been resolved, he said.

Although a staff member of the House Armed Services Committee has been reviewing the contents of the e-mail for what one Capitol Hill source called "at best an overzealous e-mail and at worst possible violations of federal or Defense Department security policy," EDS and Navy representatives vehemently denied that any policy infractions took place or that the program has hit a major snag.

"We do not connect anything to N/MCI without the Navy's approval," said Rosenberg. In addition, "there may have been an isolated incident [causing delays], but that is not the status today," he said.

Technical Snags

However, there have been recent technical snags. In one major instance, glitches caused the CIO at the Naval Air Systems Command (NAVAIR), one of the first Navy organizations to use N/MCI, to temporarily halt deployment until the technical problems could be fixed (see article at left).

Such problems and delays shouldn't be downplayed, said an IT industry lobbyist and vocal supporter of the N/MCI program who regularly meets with lawmakers on Capitol Hill to discuss the contract.

EDS kept falling further and further behind due to the testing delays and because of the large number of legacy applications that had to be dealt with, the source said, adding that "the delays were killing this contract."

One Navy Unit's Struggle With N/MCI

Susan Keen is CIO at NAVAIR in Patuxent River, Md., the first Navy command scheduled to switch to N/MCI-based IT services. Keen recently ordered a halt to deployment until significant technical problems could be fixed.

In an internal May 6 memorandum obtained by *Computerworld*, George Kalnasy Jr., the N/MCI transition manager for NAVAIR, outlined major technical problems that have made the switch to N/MCI "painful" for the organization's IT workers (see "Issues and Answers" box above).

"It has been painful for the NAVAIR folks who have built and delivered successful IT capabilities to the Navy," wrote Kalnasy, adding that "inoperative functionalities" have made N/MCI ineffective.

According to a source at NAVAIR, which is one of the major test beds for N/MCI, two-thirds of the organization's users have been forced to use two computers – one to access N/MCI and one for various legacy applications that either haven't passed security testing or don't run on Windows 2000.

The Kalnasy memo states that as of May 3, the major challenges facing NAVAIR included problems with its Remote Access Service that affected 675 out of 1,096 users, legacy applications that weren't fully operational, requiring the use of a second desktop or kiosk, nonoperational secure Web access, and problems with the ability of the help desk to solve problems in a timely manner.

Rick Rosenberg, program executive at EDS, the Navy's prime N/MCI contractor, said that all of the NAVAIR problems have been fixed and that the company has since started deployment of additional seats.

Navy Capt. Chris Christopher, deputy director for plans and oversight of the N/MCI program, acknowledged that NAVAIR "has proved to be a real technical challenge." However, any statements by users that the program isn't working or in danger of imminent failure "simply aren't accurate," he said.

– *Dan Verton*

BRIEFS

Sun to Add Patch Tool With Solaris 9

Sun Microsystems Inc. said it plans to include a Java-based software patch management tool as part of its Solaris 9 operating system, which is scheduled to be formally announced May 22 and become available next month. The Patch Manager utility will let users scan their systems for security vulnerabilities and automatically download available patches, according to Sun.

IBM Builds 1TB Tape, But Use Far Off

IBM said it has developed a prototype tape cartridge that can store 1TB of data, 10 times more than the largest cartridge it sells now. But the 1TB model isn't likely to be ready for production for three to four years because the prototype transfers data at just 15MB/sec., said IBM. Current tape cartridges have data-transfer rates of up to 200MB/sec.

State Department Gives IT Pact to CSC

Computer Sciences Corp. and a group of subcontractors that includes Microsoft Corp. and Oracle Corp. won an IT services contract from the U.S. Department of State. The contract covers services related to the agency's hardware, operating systems and applications. El Segundo, Calif.-based CSC said the deal could be worth up to $100 million over five years.

Airline Web Site Uses Orbitz Software

American Airlines Inc. said it's using reservation and booking software developed by online travel site Orbitz LLC in a new version of its Web site launched last month. Fort Worth, Texas-based American was one of the five airlines that initially funded Chicago-based Orbitz.

Continued from page 1

Navy Intranet

the program, Mike Hatcher, EDS's N/MCI director for Navy Operating Forces, warned that the current deployment schedule could put the future of the program at risk.

"We have agreed with [N/MCI director Rear Adm. Charles] Munns ... that ruthlessly rolling seats is the only way for N/MCI to survive and prosper," wrote Hatcher. "Our present way of working ... if left unchanged would spell an end to the N/MCI program by summertime."

The N/MCI program is designed to replace hundreds of disparate Navy and Marine Corps computer networks with a centrally managed setup operated by EDS.

A Scorched-Earth Rollout?

In addition to an initial 60,000 seats, the Pentagon on May 3 granted the Navy permission to purchase an additional 100,000 seats based on EDS's success in meeting the requirements of the initial test and evaluatioo phase.

Officials had hoped to have 135,000 seats deployed this year. However, the Hatcher e-mail warned the EDS N/MCI team that the current deployment rate would likely result in only 60,000 seats being operational by the end of the year, leaving the program open to criticism and political attacks that could put its future in jeopardy.

In fact, Hatcher referred to a meeting betweeo Munns and Al Edmonds, president of EDS's government information solutions division, during which Edmonds reportedly characterized the new deployment plan as "a scorched-earth seat rollout."

Rick Rosenberg, EDS's program executive for N/MCI, downplayed the e-mail, calling it a "rallying cry for the troops" that used inappropriate language.

Part of the EDS/Navy "scorched-earth" deployment plan includes a directive to EDS installers to no longer wait for security certifications to make their way through the various bureaucratic layers of the Navy before beginning installation of N/MCI seats. Instead, EDS employees will now install N/MCI systems simultaneously while waiting for the Navy to issue final, signed Interim Authority to Operate letters. Any application that fails or is expected to fail security certification, or that doesn't run on Windows 2000, will be automatically installed on a kiosk separate from N/MCI, "no questions asked," according to Hatcher's e-mail.

Issues and Answers

There are the problems cited in internal memos dated April 25 and May 6, with responses from EDS and Navy spokesmen:

1. The current deployment schedule could result in failure of N/MCI by summer.

Navy Capt. Chris Christopher, deputy director for plans and oversight of the N/MCI program: "There have been a lot of distractions. It's been like a dog sled with all of the dogs running in different directions. But we have to roll out seats."

2. NAVAIR's Remote Access Service (RAS) isn't working.

Rick Rosenberg, EDS's program executive for N/MCI: "We had a RAS problem, but N/MCI remote access works. For NAVAIR, there's an additional functionality that has to be tested on for calendaring and scheduling. However, RAS at NAVAIR is fixed."

3. Legacy applications aren't fully operational. This requires users to use a second desktop or a kiosk.

Christopher: "The legacy applications [challenge] is something the Navy did not understand when it started the N/MCI effort. We've since started a Navy application database task force. Kiosks are part of the transition."

4. Secure Web site access isn't operational.

Rosenberg: "Secure Web access is a Navy policy issue that needs to be resolved."

5. The ability of the Network Operations Center help desk to solve problems in a timely manner is a major problem.

Rosenberg: "A limited number of cases were impacted." The problems, mostly a matter of training, have since been resolved, he said.

Although a staff member of the House Armed Services Committee has been reviewing the contents of the e-mail for what one Capitol Hill source called "at best an overzealous e-mail and at worst possible violations of federal or Defense Department security policy," EDS and Navy representatives vehemently denied that any policy infractions took place or that the program has hit a major snag.

"We do not connect anything to N/MCI without the Navy's approval," said Rosenberg. In addition, "there may have been an isolated incident [causing delays], but that is not the status today," he said.

Technical Snags

However, there have been recent technical snags. In one major instance, glitches caused the CIO at the Naval Air Systems - Command (NAVAIR), one of the first Navy organizations to use N/MCI, to temporarily halt deployment until the technical problems could be fixed (see article at left).

Such problems and delays shouldn't be downplayed, said an IT industry lobbyist and vocal supporter of the N/MCI program who regularly meets with lawmakers on Capitol Hill to discuss the contract.

EDS kept falling further and further behind due to the testing delays and because of the large oumber of legacy applications that had to be dealt with, the source said, adding that "the delays were killing this contract."

One Navy Unit's Struggle With N/MCI

Susan Keen is CIO at NAVAIR in Patuxent River, Md., the first Navy command scheduled to switch to N/MCI-based IT services. Keen recently ordered a halt to deployment until significant technical problems could be fixed.

In an internal May 6 memorandum obtained by *Computerworld*, George Kalnasy Jr., the N/MCI transition manager for NAVAIR, outlined major technical problems that have made the switch to N/MCI "painful" for the organization's IT workers (see "Issues and Answers" box above).

"It has been painful for the NAVAIR folks who have built and delivered successful IT capabilities to the Navy," wrote Kalnasy, adding that "inoperative functionalities" have made N/MCI ineffective.

According to a source at NAVAIR, which is one of the major test beds for N/MCI, two-thirds of the organization's users have been forced to use two computers – one to access N/MCI and one for various legacy applications that either haven't passed security testing or don't run on Windows 2000.

The Kalnasy memo states that as of May 3, the major challenges facing NAVAIR included problems with its Remote Access Service that affected 675 out of 1,096 users; legacy applications that weren't fully operational, requiring the use of a second desktop or kiosk; nonoperational secure Web access; and problems with the ability of the help desk to solve problems in a timely manner.

Rick Rosenberg, program executive at EDS, the Navy's prime N/MCI contractor, said that all of the NAVAIR problems have been fixed and that the company has since started deployment of additional seats.

Navy Capt. Chris Christopher, deputy director for plans and oversight of the N/MCI program, acknowledged that NAVAIR "has proved to be a real technical challenge." However, any statements by users that the program isn't working or in danger of imminent failure "simply aren't accurate," he said.

– Dan Verton

less than / *abbrev* **<**

As markets sag and budgets shrink, we know you're trying to do more and more with less and less. So here are just a few ways Sprint can help you create more value for a lot less (less hassle, less time, less waste, less money — you get the picture).

One source from voice to data to wireless

Sprint gives your business the advantage of one single point of contact domestically and globally for voice, data, Internet and managed services. Our integrated approach means everything works together to help you lower your administrative and management costs.

Second to none in network reliability

Our self-healing SONET ring architecture provides 99.999% reliability. (It doesn't get much better than that.) In fact, Sprint's long distance network had the fewest FCC-reportable outages of the top three major competitors for the sixth straight year. So you get the virtually error-free data and voice transmissions that help ensure your customers' loyalty and your company's bottom line.

Customized integration

Sprint lets you leverage the investment you've already made in most existing systems and applications. But when you're ready to move to new technology, we've made it faster and more affordable by investing in interoperable product platforms. (Our network boasts seamless interoperability between IP, Frame Relay and ATM platforms.) And using existing network solutions and equipment while you adopt new technologies can drive lower capital expenditures.

More value at a price that's less than you might think — another sign of an intelligent network and the people who make it work (for you).

Find out how to create more value with invaluable (but free) white papers from Sprint. Visit **sprint.com/whitepapers/11** or call **1-877-519-1709.**

Sprint.

Copyright © Sprint 2002. All rights reserved.

The difference between success and failure

is 1/1000th of a second. And with so much at stake, IT managers at SchlumbergerSema can't waste time when it comes to wiring some of the world's largest sporting events.

Which is why they head to best-of-breed vendors. Servers, PC's, printers, routers, switches and databases are spec'd from the usual suspects, but they also need comprehensive management software to tie all of this disparate hardware together.

And in one recent case, HP OpenView management software perfectly fit the bill.

The assembled infrastructure handled everything from security check-ins to live time stats to e-mail intranets for athletes, coaches and statistic-hungry media—instantaneously. That meant up to 25,000 different system interfaces, including 10,000 live nodes, all controllable from a centralized mission-critical data center. All told, thousands of workers and millions of viewers had real-time stats, updates and forecasts—the instant points went on the board. (Incidentally, the computer system took care of that too.)

Whatever the event, keeping all these plates spinning is always quite a challenge, and HP OpenView handles it by providing monitoring systems that spot trouble and avert downtime. And with so much always riding on so little time, SchlumbergerSema can't spare an instant for a single system holdup.

HP infrastructure solutions are engineered for the real world of business. Because the last time we checked, that's where we all work. For more information on how HP OpenView software can keep your business racing along, *call 1.800.HPASKME, ext. 246. Or visit www.hp.com/go/infrastructure.*

Infrastructure: it starts with you.

BRIEFS

HP Turns Q2 Profit

Despite a tough economy and a bitter proxy fight, Hewlett-Packard Co. met analysts' expectations as it reported a profit for the second quarter in its last earnings report before its merger with Compaq Computer Corp. HP reported revenue of $10.6 billion, or a decline of 9% from last year's numbers for the second quarter. The company announced earnings per share of 25 cents, down slightly from 28 cents per share in the first quarter.

SEC Expands CA Accounting Probe

The Securities and Exchange Commission (SEC) is formally investigating Computer Associates International Inc.'s accounting practices and has issued subpoenas to outside parties for relevant documents, CA disclosed last week in a regulatory filing. The SEC filing came the day after Islandia, N.Y.-based CA reported a $236 million net loss on revenue of $772 million for its just-ended fourth quarter.

Sun ONE to Offer Yahoo Content

Under a deal announced last week, Sun Microsystems Inc. will integrate Sunnyvale, Calif.-based Yahoo Inc.'s Enterprise Edition portal into its Sun ONE Portal Server, tying together content users might want with the custom portals their employers want them to use at work. After a 120-day free-trial period, customers will be able to subscribe for continued service on a per-seat or per-CPU basis. The typical cost is $200,000 to $300,000 for an average-size company, Yahoo said.

Epiphany Cuts Jobs

Customer relationship management vendor E.piphany Inc. in San Mateo, Calif., laid off about 15% of its 600 employees in an attempt to cut costs and meet its year-end goal of being profitable.

Cisco Takes Another Shot at Storage Over IP

Returns to marketplace with new router

BY LUCAS MEARIAN

CISCO SYSTEMS INC last week released an iSCSI/Fibre Cbannel over IP storage router that analysts say maps out the company's direction in the storage networking marketplace.

The Cisco SN 5428 storage router will allow enterprise workgroups to create storage-area networks (SAN) using a combination of Fibre Channel, Gigabit Ethernet and SCSI over IP (iSCSI) protocols over an IP network.

The 5428 is Cisco's second foray into the storage over IP market. In April 2001, Cisco released the 5420, a gateway device that connected Fibre Channel storage devices over an IP network. That, said analysts, was a trial balloon in the Fibre Channel connectivity marketplace that proved to have few takers.

The 5428, priced at $11,995, comes witb two Gigabit Ethernet ports, eight Fibre Channel ports and three management ports.

A Midpoint Release

Tony Prigmore, an analyst at Enterprise Storage Group Inc. in Milford, Mass., said the 5428 router is a midpoint iteration between the 5420 and the upcoming release of a multiprotocol, highly intelligent storage switch from San Jose-based Andiamo Systems Inc., a storage networking vendor that's mostly owned by Cisco.

The Andiamo project, according to industry experts, is still in stealth mode.

Mike Kahn, chairman of The Clipper Group in Wellesley, Mass., said Cisco's foray into the storage space is driven by the evolution of iSCSI as much as anything else.

ISCSI takes SCSI commands and data and encapsulates them in IP packets for transport over networks. Cisco and other storage over IP vendors, such as San Jose-based Nishan Systems Inc., are still awaiting the release of the iSCSI standard. It's expected to be out by the end of the summer.

Also, iSCSI network interface cards have yet to be released in quantity. Without such cards, the burden of off-loading the TCP/IP commands falls on the server, eating np enormous amounts of CPU cycles.

But Kahn said Cisco's new router "could ease some of the problems that are driven by direct-attached storage.

"What we're tackling here is the next tier of data [such as e-mail traffic] that needs to be maintained but for whom laying a lot of Fibre Channel does not justify the expense," Kahn said. ▶

SAN Plan

THE SN 5428 OFFERS:

- Eight 1Q or 2Q bit/sec. Fiber Channel ports
- Two iSCSI ports for mid-range servers to extend the SAN to low-cost servers
- Logical unit number mapping and masking
- Support for 10 to 40 servers running mid-range applications such as e-mail and relational databases

STORING KNOWLEDGE

For extensive coverage of storage, visit our Storage Knowledge Center

QuickLink: 61700
www.computerworld.com

Oblix CEO: Microsoft Easiest to Work With

Says his firm will join Liberty Alliance

BY DON TENNANT

IT industry veteran **Gordon Eubanks** spent 15 years as CEO of Symantec Corp. and is now president and CEO of Oblix Inc., an identity management tools provider in Cupertino, Calif. Eubanks recently spoke with *Computerworld* about a range of controversial issues, including his view of Microsoft Corp. as an easy company for vendors to work with.

Microsoft's .Net Passport and the San Microsystems Inc.-backed Liberty Alliance do user authentication. Oblix does identity management. What's the difference? The difference is that Passport and systems like that are focused on identifying a person — authenticating who they are. Oblix is focused on helping enterprises apply that identity to business problems and being able to do this with a very low cost of ownership and with high security. So we're very complementary with Passport: You can integrate Passport right into what we do.

EUBANKS: Oblix's technology is "very complementary with Passport."

In fact, in February, you teamed up with Microsoft on Passport. How was that alliance formed? Microsoft has had for 20 years a very concerted effort at working with independent software vendors to support [Microsoft's] initiatives. I've always been outspoken in saying they were probably the easiest company to work with. If you don't support their initiatives, they don't work with you, but that doesn't seem totally wrong to me.

Why haven't you joined the Liberty Alliance? We are joining it. We're not joining it at a high level. We can't afford to play at the top level; we're a small company, [and] it's not a great use of our resources. But we're getting great support from the Liberty Alliance. We get the information we need, and when actual implementations exist, I'm sure we'll be there supporting them. Right now, though, there are real implementations of Passport.

Microsoft's not pressuring you in any way to stay away from the Liberty Alliance? I don't actually work directly with Microsoft much, but I want to say that in all the meetings I've been in, it's never come np. And I know some senior people.

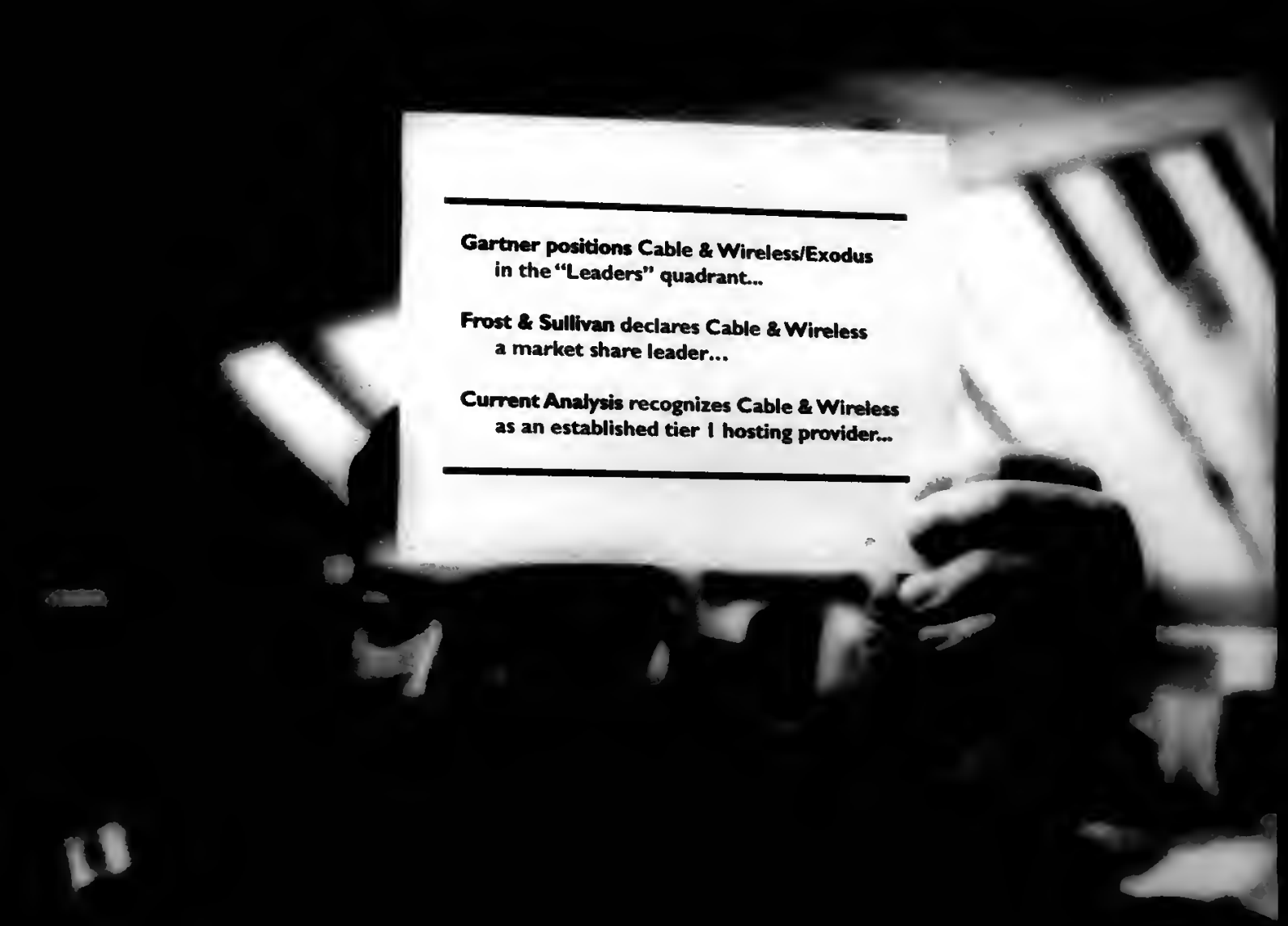
Microsoft Chairman Bill Gates asked you in 1999 to testify at the antitrust trial. Do you think you were unfairly painted as a Microsoft apologist after that? I really don't think it's fair to say I'm a Microsoft supporter as much as I'm a supporter of what's happening in the industry. I don't think that was the press's brightest moment of being open-minded.

Novell Inc. is one of the original investors in Oblix. Are you doing anything with Novell? Well, they first have to figure out what the hell they're going to do. ▶

MORE GORDON

Read the full text of the interview with Gordon Eubanks online.

QuickLink: 29660
www.computerworld.com

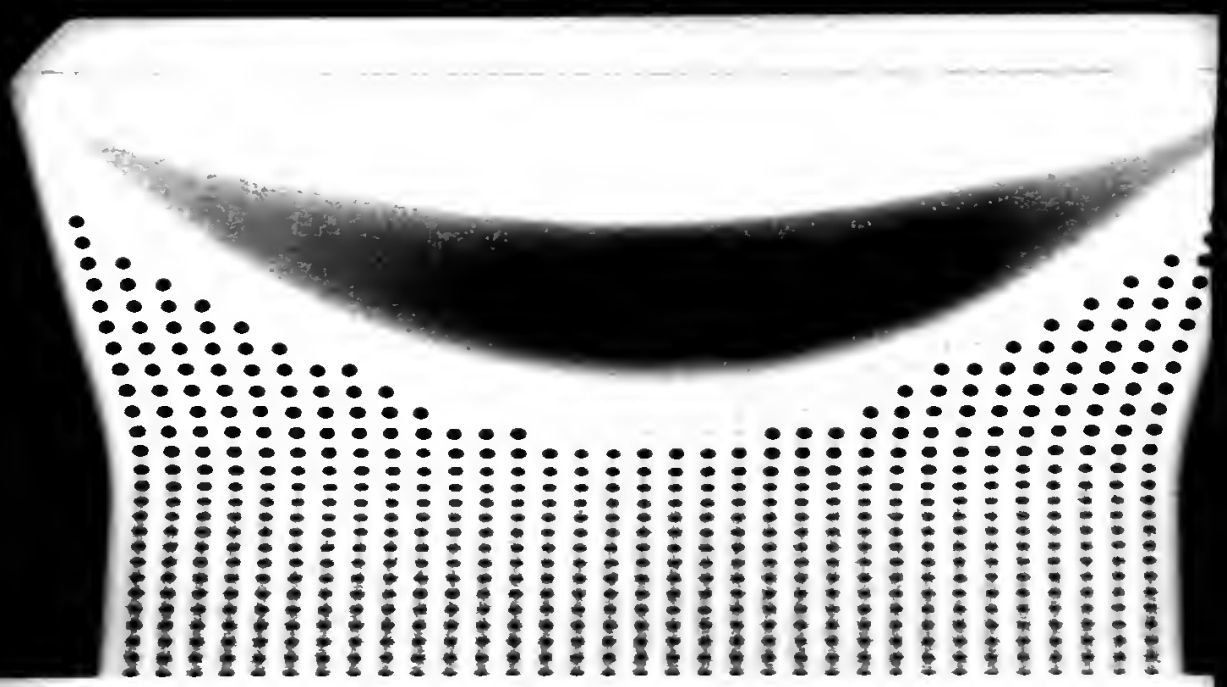

Gartner positions Cable & Wireless/Exodus in the "Leaders" quadrant...
Frost & Sullivan declares Cable & Wireless a market share leader...
Current Analysis recognizes Cable & Wireless as an established tier 1 hosting provider...

Sometimes what others say really does matter. When considering the strongest partner to meet your Internet services needs, the opinion of experts counts. Industry thought leader Gartner, Inc. has positioned Cable & Wireless, and its Exodus business, as a "Leader" in the Magic Quadrant. Plus, Current Analysis and Frost & Sullivan have given Cable & Wireless their highest ratings. We provide businesses with a world-class global infrastructure and the industry's most comprehensive offering of flexible and secure managed Internet services. We're a financially stable Internet services provider with a proven track record. Find out more at www.cw.com/leader. We'd like to hear from you.

*Gartner reference Web Hosting Magic Quadrant, 2000. Gartner, Inc.
©2000 Cable and Wireless, plc. All rights reserved. Exodus and the Exodus logo are trademarks of Cable and Wireless plc and may be registered in certain jurisdictions. All other trademarks are the property of their respective owners.
The Magic Quadrant is copyrighted March 2000 by Gartner, Inc. and is reused with permission. Gartner's permission to print its reference in Magic Quadrant should not be deemed to be an endorsement of any company or product depicted in the quadrant. The Magic Quadrant as Gartner's opinion and is an analytical representation of a marketplace at and for a specific time period. It measures vendors against Gartner-defined criteria for a marketplace. The positioning of vendors within a Magic Quadrant is based on the complete evaluation of many factors. Gartner does not endorse companies to whom only those listed in the Leaders segment, in many situations, those in the Visionary, Challenger or Niche Player segments may be the right vendor for an enterprise's requirements. Well-informed vendor decisions should rely on more than a Magic Quadrant. Gartner research is intended to be one of many information sources including other published information and direct analyst interaction. Gartner expressly disclaims all warranties, express or implied, of fitness of this research for a specific purpose.

EXODUS
A CABLE & WIRELESS SERVICE

Now the left hand knows what the right hands are doing.



Microsoft Project Server 2002

© 2002 Microsoft Corporation. All rights reserved. Microsoft is a registered trademark of Microsoft Corporation in the United States and/or other countries.

Introducing Microsoft Project Server 2002, the newest way to manage your enterprise projects at every organizational level. Today's complex projects have grown to encompass multiple departments, organizations, and geographies, which means visibility and collaboration are more essential then ever. Part of the Microsoft® .NET family of servers, Microsoft Project Server 2002 works with Microsoft Project Professional 2002 to help you manage resources and model projects across your portfolio. Web-based access to project information keeps everyone in the loop, at any time and from anywhere. And the open architecture in Microsoft Project Server 2002 allows you to deploy a customized, secure, enterprise-scale project-management solution that integrates with your current business systems. So even when there are lots of hands on the job, they're still of one mind.

Find out how Microsoft Project Server 2002 can help you manage projects across your organization. Go to **goprojectserver.com** Software for the Agile Business.

Microsoft

MARYFRAN JOHNSON

'Best Places' Backlash

WE HAD BARELY published our Best Places to Work in IT report two weeks ago [QuickLink: a1970] when the angry e-mails and phone calls started to come in. "Are you serious? This company is a horrible place to work!" wrote one IT worker at Aetna (No. 49 on our list). In another note, an employee at Comerica (No. 9) scoffed at our naiveté in believing the executives we interviewed. "Your visit there was scripted, the people you spoke to were preselected and the impression you left with was misled," this one wrote. I also heard from an anguished manager at MindTree Consulting (No. 66), who had an extensive, heartfelt list of problems with his employer.

But by far the most organized, vociferous objections — more than two dozen protests at last count — came from current and former employees of Electronic Data Systems (No. 32). We heard from people who have gone public with their complaints online on Vault.com, Yahoo message boards and EDSlawsuits.com. On the page opposite, we've published a few of their letters.

Of course, complaints from a handful of unhappy IT people out of the 62,000-plus IT workforce at EDS has to be kept in some perspective. "These folks obviously feel very passionately about what they believe, and in many ways, it's hard to respond," EDS CIO Terry Milholland told me last week. "This is not your father's EDS, where you can stay for 30 years and get rewarded for longevity."

The IT services giant has changed many of its human resources policies since 1999 to create a "meritocracy" that richly rewards top performers and limits severance pay to a couple of weeks at best. The money saved on severance packages, in fact, pays for those top-gun bonuses.

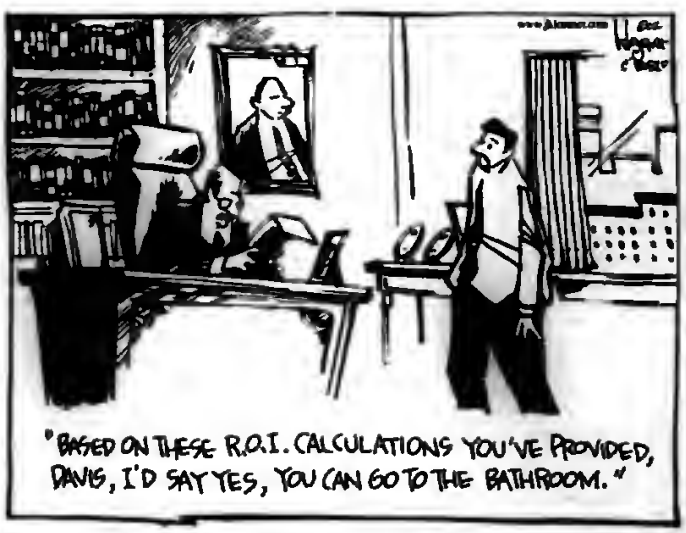
In exchanging notes with our Best Places protesters, I've found many of them to be reasonable people despite their lingering hurt and anger. They've offered useful ideas for improving our survey with more direct feedback from rank-and-file workers.

"I see your dilemma: You acquire a lot of information on a lot of companies, and because of your limited resources, rely on the integrity of those answering," wrote one critic with the colorful log-on of SittingDuckatEDS. "The problem is, you are asking the fox to guard the henhouse and report back to you."

It's true that we do rely on company executives and managers for much of the information we gather. But our 75-question survey has actually grown over the past decade as we've added numerous questions suggested by readers.

We collect dozens of facts about each firm, including IT budget, company revenue, merger history and changes in IT staffing levels. We ask for specifics on employment benefits, retention programs, recruiting methods, bonus history and mentoring. We find out how many women and minorities work in the IT department, what training options are available and what kind of IT projects are most valued. We sort all this information with a database program and then pipe it into an Excel spreadsheet to determine the rankings.

At the end of it all, any awards program is a beauty contest where appearances count more than reality. Judging whether a company is truly a great place to work is a tough call for outsiders to make. But with your help, we'll keep trying. ◗



PIMM FOX

Back to School For IT Workers

THE IT WORKFORCE will need 1.1 million new workers this year, according to the Information Technology Association of America, but 600,000 of those positions will go unfilled. The reason: no qualified applicants.

Patricia Keefe addressed this issue here last week, but I want to approach it differently. It's not that we don't have talented workers; rather, they lack the balance of management experience and technical skills employers seek.

Roger Schank, chief education officer at Carnegie Mellon University's new West Coast campus, says much of the problem is experience. "I hear from companies who say they have kids with IT skills in positions of power who don't know how to manage, but they're running a group and making bad decisions," says Schank.

Carnegie Mellon is trying to do something about the problem by reinventing graduate-level education for IT professionals through courses created in conjunction with businesses.

Schank says doctoral students learn what professors are researching, while undergraduates learn standard material. "Which leaves the master's level as middle ground," he says. A master's degree program must be practical to be valuable in the workplace while engaging enough to hold the attention of IT professionals who groan at the prospect of sitting through lectures.

Indeed, Lewis Temares, dean of the College of Engineering at the University of Miami, says it's valid to make the distinction between education as opposed to training. "There's a huge difference and a place for both," he says. Education gets you thinking after you learn the foundation, Temares told me, adding, "The question is, When stu-

For more columnists and links to archives of previous columns, go to computerworld.com/columns

dents finish, will their diploma and knowledge be comparable to a student on the campus in a regular program?"

That's why Carnegie Mellon's project-based approach in Silicon Valley will pair courses with real-world company needs and still offer classroom time, in an 80/20 mix, with real-world situations getting the most time.

Lockheed Martin is Carnegie Mellon's first partner for the new master's degree in IT management. The curriculum forces students to take on different roles on a software project team, grooming them for leadership positions and promoting project management skills. Dorothy McKinney, chief software architect for Lockheed Martin's missile and space operation, spent 12 years teaching at San Jose State and Portland State universities. She says students on a project team, where each has the opportunity to lead and teach the others, learn more than they would just listening to lectures.

Companies should take the initiative with higher education institutions to tailor degree programs to suit their needs — and encourage and financially support workers to set higher educational goals.

In a recession, it's a shame for IT jobs to go to waste for lack of qualifications.

DAN GILLMOR

IT Buyers Can Cash in — to a Point

THE TECHNOLOGY industry's woes have given corporate IT buyers a rare opportunity. And if they don't translate that leverage into good deals now, they never will.

Vendor flexibility has reached a high point, as prices have rarely been more negotiable. But price is just one of many components of a useful product or service.

For example, consumers are learning to their dismay that many free Internet services come with a catch. Few of the providers of those services have offered useful customer service. Some have disappeared entirely. Others are reneging on privacy commitments in an effort to make money by peddling customers' information. Or they're starting to charge for their services.

No sensible IT person minds paying for a product or service. What everyone should object to is paying for a lousy one or being forced into unacceptable terms.

Yet in recent years, some sellers, Microsoft in particular, have bludgeoned buyers. Microsoft may have flouted the law, but it had the assistance of its own hapless customers, who never seemed to understand the consequences of assisting the monopolist by being so shortsighted.

Dan Gillmor is technology columnist at the San Jose Mercury News. Contact him at dgillmor@sjmercury.com.

Even in a weak economy and an even weaker industry climate, Microsoft is still telling customers what to do. The latest orders are to change licenses in ways that are good for Microsoft but not for its customers.

At least a few customers, finally confronting the consequences of supporting a monopoly over the years, have said no. (Sun's increasingly interesting StarOffice suite is providing some of the backbone, it seems.) More should do so. And all who do sign new license agreements should insist on major changes to restore a little of the balance that once existed but has shifted so dramatically.

This applies to all vendors, not just Microsoft. Face it: The big ones would all behave in much the same way given the opening.

That's why the industry has pushed so hard for UCITA, the Uniform Computer Information Transactions Act. This pernicious law, enacted so far only in Maryland and Virginia (and there with some conditions attached), tilts the balance even further toward sellers and away from buyers and has been properly denounced by just about everyone but the technology industry.

IT should seize this chance, not just to extract better terms and conditions from its vendors, but also to help put a stake once and for all into the UCITA menace, which keeps coming back like a legal Dracula even when we assume it's dead. Every buyer should make clear to sellers that their continued support of UCITA is a strongly negative point in contract negotiations.

But while many in the high-tech industry have abused their positions, that's no excuse for IT buyers to abuse theirs now.

The risk today is that IT will take its leverage too far, insisting on terms that could threaten the ability of providers to do their jobs right, or at all, in the long run. Getting a good deal today isn't worth it if the ultimate result is even worse conditions.

Markets are never — and shouldn't be — perfectly balanced. But a market that moves from one extreme to another can be just as dangerous, since it can create a disincentive for suppliers.

READERS' LETTERS

Ranking EDS

REGARDING YOUR report on the Best Places to Work in IT, it would seem you have been provided some bad information on EDS [QuickLink: a1970]. I have worked at EDS a number of years. I haven't seen the mentoring, internships, flextime, performance bonuses or rewarding work environment. We have had week after week of layoffs and are told more are to come. Lots of people have gone years without pay raises, in spite of consistent quality work. Jobs are being moved offshore. If you're in the senior executive leadership of the company, then, yes, most of your article is probably accurate. I don't know of any employees who would recommend EDS as a place to work.

Name withheld
Analyst
EDS
Plano, Texas

I WAS ABSOLUTELY astounded by EDS's ranking. I worked for EDS for seven years, routinely working nights, weekends and holidays and never receiving any compensation for any of the overtime. I applied twice for educational assistance to upgrade my skills and was turned down on both occasions. I finally took a loan against my 401(k) for the retraining I wanted. I was told on March 19 that my job would be outsourced on May 1, despite a "valued contributor" performance evaluation complete with glowing remarks from the customer and a 5% pay raise effective March 1. I began searching for another job and found one, thankfully. When I resigned, management listed the reason for my leaving on a state form as "terminated — refused to perform assigned work." I received no severance, no letter of reference and none of the usual reduction-in-force benefits. I am relieved to be an ex-EDSer. You might want to check out the EDSlawsuits.com Web site.

Michael A. Chancey
Atlanta

YOUR ARTICLE on EDS as a Best Place to work is a joke. EDS is committed to three things: diluting salaries, reducing benefits and eliminating retirement. If that's a good employer, I'm the queen of England.

Richard Randall Mohler
Midland, Mich.
rrmohler@diamondcs.net

Best Places for Whom?

YOUR RECENT Best Places to Work in IT report is grossly misnamed. According to the methodology, you surveyed "CIOs, vice presidents and IT directors" and compiled their responses. So what you have is the list of the places that CIOs, vice presidents and IT directors think are best, not what the people who actually work for a living think.

Tom Gillespie
Atlanta

Calculating Server Stats

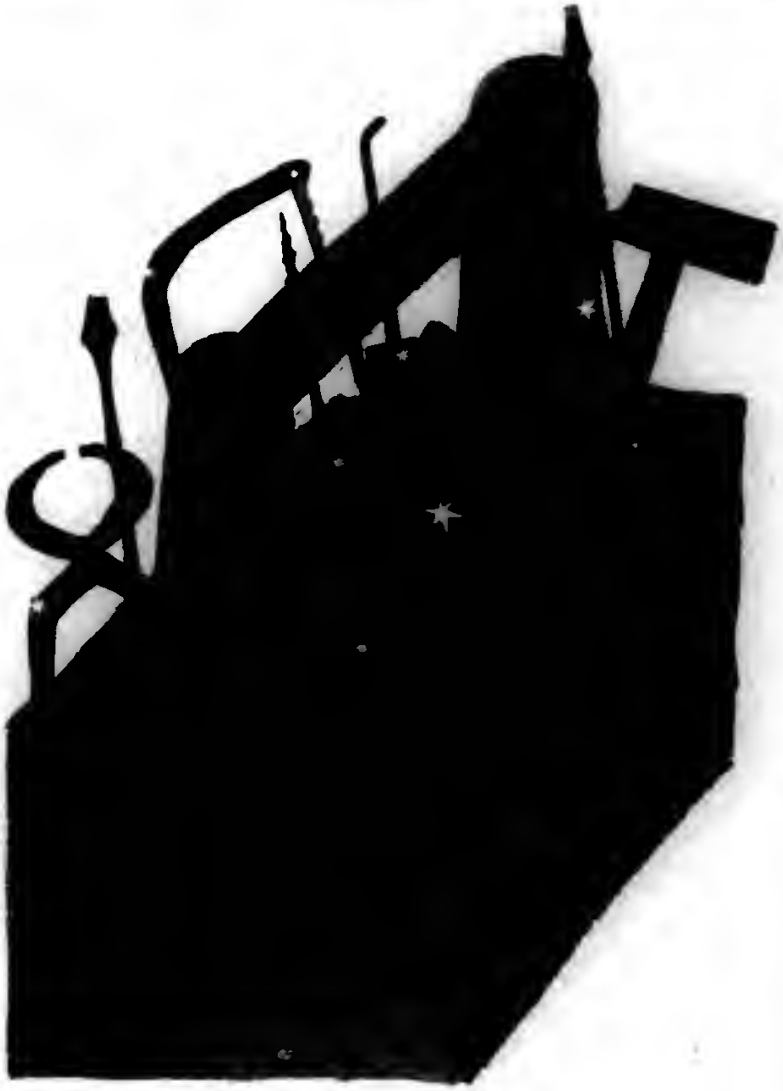
"IIS USAGE May Not Be as High as Survey Says," but then again, neither is Apache's [QuickLink: 29453]. Apache proponents have long been using these numbers knowing full well that they included a large number of parked domains. It's hypocritical that they cry foul when the same misleading stat they used against Microsoft is used against them. Microsoft can provide an impressive number of companies that use IIS as their frontline Web server; so can Apache and iPlanet. A better metric would be to understand, per site, the number of *dynamic* page views per day and the Web server used, and per site, the number of *static* page views per day and the Web server used. The Netcraft survey is OK, as long as you understand the context.

Michael J. Geiser
Oaks, Pa.

COMPUTERWORLD welcomes comments from its readers. Letters will be edited for brevity and clarity. They should be addressed to Jamie Eckle, letters editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax: (508) 879-4843. Internet: letters@computerworld.com. Include an address and phone number for immediate verification.

For more current letters on these and other topics, go online to computerworld.com/letters

VERITAS



New Tools, New Choices

Java or .Net? Which tools for Web services? Here's a guide for making those big decisions.

EDITOR'S NOTE

YOU HAVE some unusually big, bet-your-career decisions to make regarding software development these days. Do you migrate to Microsoft's new .Net environment, or move to Java 2 Enterprise Edition? Or, if you'll inevitably have a mix of both, what should that mix look like?

The emergence of Web services as The Next Big Thing has also given IT managers a lot to think about. Vendors (and some publications) are touting Web services as an IT panacea and a paradigm-shifter.

But *Computerworld* approaches this much-hyped topic with a healthy dose of skepticism: Some of our earliest stories on Web services warned of security and reliability problems [QuickLink: 26695]. Indeed, using the words *security* and *Web services* in the same sentence can cause laughing fits in the newsroom.

On the other hand, we know that pioneering users, such as CitiMortgage, a division of financial services giant Citigroup, are making a major commitment to Web services because of the benefits of reusable software components. The benefit for CitiMortgage is about 6,000 hours of programmer time saved each year.

As it turns out, security for Web services (OK, I'm holding back the giggles) isn't a black-and-white issue. As Robert L. Scheier explains in his article (page 40), some companies are plunging into Web services anyway because the information at risk just isn't very sensitive and the benefits are so great. Current security protocols are "good enough" for these applications.

It's a great example of how conventional wisdom can be wrong, or at least too simplistic, because businesses and IT environments vary a lot. That's why we keep interviewing IT managers: to learn what really works in a variety of business settings, because sometimes we hear surprising things.

And then we share those findings with you, in special reports like this, to help you make those big decisions.

Mitch Betts (mitch_betts@computerworld.com) is director of Computerworld's *Knowledge Centers.*

KNOWLEDGE CENTERS ONLINE

Knowledge Centers are the places to find practical information about specific technologies and IT topics. In addition to this monthly Special Report in print, there are numerous resources online in our Development Knowledge Center, including research links, glossaries, white papers and the following online features:

Grady Booch: In a wide-ranging interview, one of the gurus of software development describes the flaws of Web services and the future of object-oriented programming.

Case studies: Three organizations – from the transportation, defense and financial services industries – describe how they're earning ROI from their software projects.

Industry views: Executives in the development tools business sketch out the future of Web services, mobile applications and software quality.

QuickLink: k1100
www.computerworld.com

The Story So Far

Development techniques have evolved from haphazard to highly structured to fast-paced Extreme Programming. By Frank Hayes

"CODE AND FIX." That was the way most business applications were developed in the mid-1960s. Two decades had passed since John von Neumann had suggested controlling computers with programs stored in memory instead of patch wires in 1945, and the prototype computer named Baby at The University of Manchester in England had successfully run the first stored program in 1948. But application development was still a pretty haphazard process.

Yes, there were high-level programming languages. Fortran was developed by John Backus at IBM starting in 1954, and IBM began selling Fortran compilers in 1957. Remington Rand Inc.'s Univac offered Grace Hopper's Flow-Matic language for business applications in the late 1950s, and that language became the basis for Cobol in 1959. And in 1964, IBM unveiled its "all-purpose" language, PL/I, which had elements of Fortran, Cobol and Algol.

Sabre Takes Off

But there was virtually no commercial software industry. Data processing departments had no choice but to build their own applications — and with few standards or best practices, building a large applicatioo was a costly, error-prone process. When Fort Worth, Texas-based American Airlines Inc. built the first version of its Sabre reservation system from 1960 to 1964, it required 400 man-years of effort at a development cost of almost $40 million.

That started to change in 1965, when Dutch researcher Edsger Dijkstra began publishing journal articles suggesting a more structured approach to programming. Other researchers proposed improved ways of planning and managing projects, and in 1970 W.W. Royce proposed the "waterfall" structure for dividing large projects into well-defined phases.

Structured programming got its first major test in the early 1970s, when a team of IBM programmers led by Harlan D. Mills wrote a computer system for *The New Ynrk Times*. The huge project was delivered oo schedule and with a minimum of bugs — an astonishing accomplishment for the time.

And throughout the '70s, tools and techniques for software development came thick and fast: Tom DeMarco's structured design and analysis, Niklaus Wirth's Pascal, Larry Constantine's structured design, Clive Finkelstein's Informatioo Engineering and many nthers. By 1982, researchers conoted 48 different software development methodologies in use.

Meanwhile, the cost of computer hardware was dropping — and the demand for faster and cheaper application development was climbing. In 1962, before the improvements in software development, software was still only 20% of the cost of a typical computer system. By 1985, software was 80% of the cost — four times as much as the hardware.

That shift drove a demand in the late '80s for computer-aided software engineering (CASE) tools that would automate applicatioo development methodologies and, in theory, cut both schedules and bugs. But in most corporate data processing shops, '80s-era CASE would never catch on. Huge mainframe-based systems had already been built and maintained successfully fnr years by programmers who weren't about to let the computer — in the form of CASE tools — tell *them* what to do.

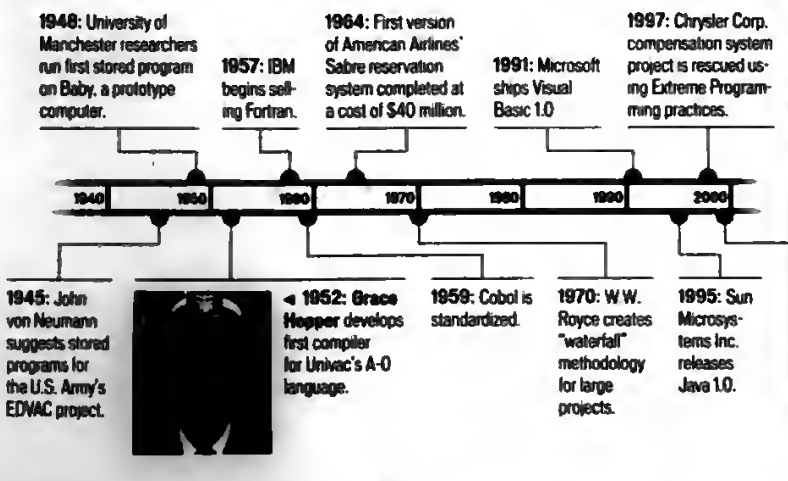
Enter: PCs and LANs

Meanwhile, PCs and their oetworks were arriving in large organizations, and with them the need to replace aging terminal-based applications with client/server versions. When Microsoft Corp. shipped Visual Basic in 1991, programmers' attention shifted to the graphical user interface nn the desktop. And, with spreadsheets' ability to access corporate databases, developers were learning tn focus oo building connections instead of building everything from scratch.

The 1990s saw the buy-instead-of-build approach spread from the desktop to enterprise applications — just as the World Wide Web was suddenly creating the need for a new generatinn nf custom-built Web programs for customers to use. Meanwhile, $1 trillion in resources was thrown at programming's most infamous fiasco, the Y2k problem.

Today, application development means wiring Web sites to packaged software and legacy systems, integrating Web services with existing applications — and working with ever-faster programming techniques with names like Extreme Programming, Crystal and Scrum.

And now, on with the story . . . ▸



1945: John von Neumann suggests stored programs for the U.S. Army's EDVAC project.

1948: University of Manchester researchers run first stored program on Baby, a prototype computer.

1952: Grace Hopper develops first compiler for Univac's A-0 language. ◂

1957: IBM begins selling Fortran.

1959: Cobol is standardized.

1964: First version of American Airlines' Sabre reservation system completed at a cost of $40 million.

1970: W.W. Royce creates "waterfall" methodology for large projects.

1991: Microsoft ships Visual Basic 1.0

1995: Sun Microsystems Inc. releases Java 1.0.

1997: Chrysler Corp. compensation system project is rescued using Extreme Programming practices.

▲ **1999-2000:** The year 2000 date rollover problem requires expensive code fixes and raises public alarm. White House Y2k czar **John Koskinen** coordinates the government's response.

Leverage your CRM Investment

FORTUNE 1000® companies now add Autonomy's technology to their brand name CRM systems to automatically and intelligently process all their customer communications, including text and voice. After all, customers don't talk to just a database, they mail and phone too. Find out how companies are adding Autonomy intelligence to **Oracle, E.piphany, PeopleSoft, SAP, Siebel** and other leading CRM solutions to boost returns on their investment.

Autonomy makes sense of human friendly information such as email, phone calls, letters and reports; and by automating their handling, delivers real bottom-line benefit to the enterprise... In an unstructured world, intelligence counts.

Call us free on 1-877-MYAUTONOMY or visit our website www.autonomy.com to find out how to add power and value to your CRM application.

Autonomy

Copyright © 2002 Autonomy Corp. All rights reserved. Other trademarks are registered trademarks and the properties of their respective owners

PEP MONTSERRAT

Five big decisions you'll need to make when choosing which development tools to use where. By Carol Sliwa

.Net vs. Ja

THREE YEARS AGO, TD Bank Financial Group decided to go with Java as its enterprise development platform, in large part because it wanted its application code to be able to run on different types of hardware.

But Claudia Radasanu, senior vice president of development services, says the Toronto-based financial institution must now investigate the rival .Net environment that Microsoft Corp. launched in February — even though her firm made a huge investment in IBM's Java-centric WebSphere application server and has no immediate plans to make costly changes.

"What if the total cost of ownership is lower on .Net? You always have to ask the 'what if,' " Radasanu says.

Corporations will find it tough to settle on a single development architecture such as .Net or Java 2 Enterprise Edition (J2EE), "unless they are the size of a dentist's office," says Yefim Natis, an analyst at Gartner Inc. in Stamford, Conn.

Mixed environments of mainframes, Unix, Windows and proprietary systems will drive most enterprises to use both J2EE and .Net, particularly if they've been involved in mergers and acquisitions, some analysts say.

"The question is not whether J2EE or .Net is the better architecture," Natis says. "The question is, How to integrate them, how to make them work together, what are their strengths and weaknesses?"

Some IT shops may use .Net for some types of new projects and Java for others. Others may explore using .Net for the presentation layer, to take advantage of Microsoft's client-building tools, or to connect to Java-based business logic via XML-based Web services or a Java/Microsoft bridge.

Whatever the choice, Randy Heffner, an analyst at Giga Information Group Inc. in Cambridge, Mass., recommends that corporate users decide on a primary platform and use "a containment strategy" for the other platform. He says that will allow an IT department to get greater synergy of development, operations and application management skills.

The following are some points that IT managers should consider when weighing the choice of .Net vs. Java:

1 Weigh the importance of application portability to your company. Java may not have entirely lived up to its "write once, run anywhere" promise. But Heffner says J2EE portability tends to be good for core components such as business rules, Java Server Pages and Enterprise JavaBeans.

That, in turn, gives corporate users the negotiating leverage to present "a credible threat" that they'll move an application to another vendor's platform, something they can't do with Microsoft, because the .Net framework runs only on Windows, he says.

Microsoft submitted a portion of its .Net framework to a standards body, but Heffner estimates it amounts to only 10%, or "just enough for an application on some other platform to connect to a Microsoft server environment." Although there are open-source efforts to get .Net to run on other platforms, none are credible yet, he adds.

Portability has never been a concern for Microsoft, which advocates writing applications optimized to run on Windows for higher performance. Claiming that interoperability is more important than portability, Microsoft now tells users that .Net-based applications can share information with applications running on other platforms through Web services, in which XML-based messages are sent via the Simple Object Access Protocol.

Bob Dutile, a senior vice president of enterprise architecture at Cleveland-based KeyCorp, says he's interested in

Pros & Cons

J2EE

Pros	Cons
■ Runs on any operating system and application server (may need adjustments)	■ Has a complex application development environment
■ Handles complex, high-volume, high-transaction applications	■ Tools can be difficult to use
■ Has more enterprise features for session management, fail-over, load balancing and application integration	■ Java Swing environment's ability to build graphical user interfaces has limitations
■ Is favored by experienced enterprise vendors such as IBM, BEA, SAP and Oracle	■ May cost more to build, deploy and manage applications
■ Offers a wide range of vendor choices for tools and application servers	■ Lacks built-in support for Web services standards
■ Has a proven track record	■ Is difficult to use for quick-turnaround, low-cost and mass-market projects

.NET

Pros	Cons
■ Easy-to-use tools may increase programmer productivity	■ Framework runs only on Windows, restricting vendor choice
■ Has a strong framework for building rich graphical user interfaces	■ Users of prior Microsoft tools and technology face a potentially steep learning curve
■ Gives developers choice of working in more than 20 programming languages	■ New runtime infrastructure lacks maturity
■ Is tightly integrated with Microsoft's operating system and enterprise server software	■ Questions persist about the scalability and transaction capability of the Windows platform
■ May cost less, due in part to built-in application server in Windows, unified management, less expensive tools	■ Choice of integrated development environments is limited
■ Has built-in support for Web services standards	■ Getting older applications to run in new .Net environment may require effort

Microsoft's approach, but he wants the option of selecting a best-of-breed server. "One of the reasons we are a Java shop is because Microsoft was too proprietary," he says. "We like to have the opportunity not to be locked into one vendor all the time."

2 Take stock of your existing developer skills and infrastructure. Training developers and ripping out existing infrastructure can be costly, so an IT shop may favor sticking with the development environment that best fits its current situation.

Pacific Life Insurance Co., for instance, didn't hesitate to adopt .Net technology. Brad Sewell, an assistant vice presideot in IT at Newport Beach, Calif.-based Pacific Life, says his life insurance division dido't consider Java because the division is "pretty heavily invested in Microsoft infrastructure."

The Home Depot Inc. in Atlanta, in contrast, is primarily a Unix shop and made a significant commitment to Java early on. But the decision wasn't based solely on its Unix focus. "Java ran equally well on all of our hardware," says senior IT manager Curtis Chambers, noting that his company also uses Windows, MVS and z/OS. "The end goal was a common development platform for all of our developers."

Because of .Net's Windows-only limitation, Thomas Murphy, an analyst at Stamford, Conn.-based Meta Group Inc., says that for Unix shops, "the decision's made for you."

"If you're a mixed shop, you have to look at how you are mixed," he adds.

Murphy says IT managers should ask questions such as: Is Unix just the database platform, or does it have a role beyond that? How are you going to attach to legacy resources? Or are you going to try to develop new business logic on the legacy platform?

Microsoft's .Net environment allows developers to program in more than 20 languages, including Cobol, which could appeal to programmers who have worked in legacy environments. But since their .Net applications would need to run on Microsoft's Common Language Runtime, they must weigh the infrastructure consequences.

Developers skilled in using Microsoft's Visual Basic tools for building less complex applications will find a similar learning curve whether they shift to Visual Studio .Net or J2EE, if they're taking on full distributed computing and object-oriented programming, warns Frank Gillett, an analyst at Forrester Research Inc. in Cambridge, Mass.

Whatever switch is made, it costs money. Gartner analyst Joseph Feiman says a Cobol-to-Java move, for instance, can cost an average of $57,000 per developer, once training costs, time, initial lost productivity and risk are factored into the equation. But he notes the costs can vary significantly, depending on programmers' skills and the type of change they're making.

3 Assess the complexity of the applications you will be building. Microsoft tools have an edge over Java for building applications that require rich graphical user interfaces and that deliver content to Web browsers, analysts say. Although Java tools are improving, Microsoft's tools are generally considered easier to use.

Heffner says there are "more knobs to turn" in a J2EE environment. But for complex, high-volume applications with lots of business rules, "that's just the sort of knob-turning you need available," he says. Those types of applications need to be more highly architected, and J2EE has more features to offer for session management, fail-over and load balancing than the Microsoft architecture does, Heffner says.

For now, analysts say, J2EE may continue to be the preferred choice for highly scalable, mission-critical applications, and .Net may make more sense for applications that need a low-cost, quick turnaround. Natis says Gartner is advising clients to wait for .Net's next release before they consider using it to build an application that will go beyond 1,000 concurrent users.

4 Investigate outside vendor support. Murphy says that users who buy major packaged applications will probably be driven to gain some Java skills, since enterprise software vendors such as SAP AG and Oracle Corp. lean toward Java.

Another consideration may be the tendencies of the independent software vendors that develop applications for a particular vertical industry. Heffner says one insurance company chose J2EE because five of its six peers did.

Analysts also note that tools and components may be more readily available for Java now, since .Net is so new. However, Microsoft, has already put out a thick binder entitled ".Net in the Real World," featuring early adopters.

5 Compute costs with care. On a straight cost basis, Microsoft presents an appealing option. Its Windows server operating system ships with a built-in application server, while pricing for the most popular Java-based application servers starts at $8,000 to $10,000 per CPU.

There are other options. Hewlett-Packard Co., for instance, ships a free application server with its operating system, and JBoss is an open-source alternative, analysts say. But the top two choices, by far, have been San Jose-based BEA Systems Inc.'s WebLogic or IBM's WebSphere.

Rather than simply looking at the costs of application servers, Heffner advises clients to use a total economic impact model that takes into account costs, benefits and flexibility for future options. "In this case, you're making a strategic platform decisioo that will affect not only this one application; it will affect the stream of application delivery that you're going to pursue as a company over the coming years," he says.

va

SCALABILITY MATTERS

Microsoft continues to battle a perception problem regarding the scalability of the .Net environment.

QuickLink: 29656
www.computerworld.com

IBM.

Storage in every size and width.

The difference between winning and losing is a little thing called "storage." And the winning play is integrated storage solutions. Why? Hardware and software that fit and work together speed implementation. They allow you to maximize your current infrastructure investments and help reduce risk. IBM TotalStorage™ solutions are complete, cross-platform storage offerings that cover storage networking, disk, tape, software and services. For example, IBM NAS gives you amazingly scalable data storage that fits into just about any LAN–fast. IBM FAStT offers some of the highest performance, most affordable midrange disk storage available today. Are you bent on winning? You can test-drive any IBM storage solution at one of over 140 IBM TotalStorage Solution Centers. Find out where, at **ibm.com**/totalstorage/solutions

e-business is the game. Play to win.™

Building Web Services

Field Report: Web Services

Toolkits for designing and building Web services have a core set of capabilities, including SOAP messaging integration, plus automated help for WSDL wrappers and debugging distributed Web services.

Choosing the right tools depends on the language and environment. But the most interesting question isn't "Which tool kit?" but "For which applications, and how?" When users answer this question they reveal much about the current state of Web services.

BY JON UDELL

Putting SOAP Tools to Work

TECH CHECK

For users of the new breed of Web services tool kits, there's a certain sense of deja vu. Simple Object Access Protocol (SOAP) is, after all, just another remote procedure calls (RPC) protocol; Web Services Description Language (WSDL) is just another interface definition language; and Universal Description, Discovery and Integration (UDDI) is just another directory service.

These new variations on old themes are wildly popular, and for good reason. XML flowing over HTTP makes integrating applications in and across enterprises much more open and flexible than ever before. Web services tool kits have rapidly converged on a core set of functions: They can integrate SOAP messaging with programming languages and application servers, automate the creation and use of WSDL wrappers and test harnesses, and help debug distributed Web services.

Given a rich assortment of competent tool kits, the choice for a developer quickly narrows depending on language and environment. For .Net shops, Visual Studio .Net is the clear choice, though competition will likely increase. For Java shops, the choice is influenced by the Web application server in use and by the application itself.

A Taxing Experience

ASU Solutions Inc., a Santa Clara, Calif.-based applications developer, used IBM's Web Services Toolkit in conjunction with WebSphere Studio Application Developer to create the ASU eTax Server. This is deployed as a Java 2 Enterprise Edition application to large counties with robust IT infrastructures and is hosted on behalf of smaller counties. The service lets both individuals and institutions pay property taxes via the Web.

> **"With Web services, it's possible to decouple a service, like a payment engine, from an application's user interface."**
>
> **– BOJAN VUKOJEVIC, DIRECTOR OF TECHNOLOGY, ASU SOLUTIONS**

With Web services, it's possible to decouple a service like ASU's payment engine from an application's user interface, and ASU does just that. Individuals who use the eTax Server may access it through a Web browser, by way of a translation layer that renders the

Building Web Services

PHOTOGRAPHER

Putting SOAP Tools to Work

TECH CHECK

For users of the new breed of Web services tool kits, there's a certain sense of deja vu. Simple Object Access Protocol (SOAP) is, after all, just another remote procedure calls (RPC) protocol; Web Services Description Language (WSDL) is just another interface definition language; and Universal Description, Discovery and Integration (UDDI) is just another directory service.

These new variations on old themes are wildly popular, and for good reason. XML flowing over HTTP makes integrating applications in and across enterprises much more open and flexible than ever before. Web services tool kits have rapidly converged on a core set of functions: They can integrate SOAP messaging with programming languages and application servers, automate the creation and use of WSDL wrappers and test harnesses, and help debug distributed Web services.

Given a rich assortment of competent tool kits, the choice for a developer quickly narrows depending on language and environment. For .Net shops, Visual Studio .Net is the clear choice, though competition will likely increase. For Java shops, the choice is influenced by the Web application server in use and by the application itself.

A Taxing Experience

ASU Solutions Inc., a Santa Clara, Calif.-based applications developer, used IBM's Web Services Toolkit in conjunction with WebSphere Studio Application Developer to create the ASU eTax Server. This is deployed as a Java 2 Enterprise Edition application to large counties with robust IT infrastructures and is hosted on behalf of smaller counties. The service lets both individuals and institutions pay property taxes via the Web.

> **With Web services, it's possible to decouple a service, like a payment engine, from an application's user interface.**
>
> – BOJAN VUKOJEVIC, DIRECTOR OF TECHNOLOGY, ASU SOLUTIONS

With Web services, it's possible to decouple a service like ASU's payment engine from an application's user interface, and ASU does just that. Individuals who use the eTax Server may access it through a Web browser, by way of a translation layer that renders the

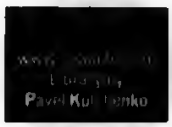
Nimble Tool Kits for Lightweight Applications

FIELD NOTES

Not every Web services tool kit can, or should, deploy the full arsenal of wizards, debuggers and application server hooks. Sometimes less is more. For Java developers, the premier lightweight Web services tool kit is undoubtedly Glue, from The Mind Electric Inc. in Addison, Texas.

One Glue user, Chris Burchett, vice president of engineering at Credant Technologies in Addison, Texas, calls the heavyweight products from IBM and BEA Systems Inc. "the kiss of death for a small start-up that wants to deliver a product this year." Credant is building a product that enforces enterprise security policies on mobile devices. A Web services interface, created with Glue, is wrapped around the policy engine to ensure that integrators can adapt it for a range of enterprise deployments. Although Credant doesn't yet push Web services to the mobile devices themselves, Glue's small footprint bodes well for such a strategy.

Another lightweight tool kit, SOAP::Lite, freeware written by Pavel Kulchenko, was just what Dave Hoover needed to solve a routine integration problem. Hoover, an Internet specialist at the American Medical Association in Chicago, was building an application to enable doctors to manage their listserver subscriptions in a centralized way. Two databases were involved: SQL Server on Windows NT and Informix on Solaris. After failing to come up with a cheap and convenient solution using Perl database drivers, Hoover says, he hit on the idea of using an instance of SOAP::Lite on each box and "was up and running really fast."



XML interface as an HTML application. Alternatively, notes Bojan Vukojevic, ASU's director of technology, individuals can access the service directly from a rich client, such as the SOAP-aware version of Excel in Office XP.

Many tax payments are made by banks aggregating funds from several escrow accounts into single payments. Boris Oak, director of sales and marketing at ASU Solutions, says having county clerks process those payments is expensive and prone to errors, but Web services can dramatically streamline the job. Also, Vukojevic says, the UDDI wizard that ASU provides lets counties publish their payment services in a directory, so a mortgage company can look up counties and batch payments on multiple properties, for example.

One thing not yet standardized for Web services is the all-important security context for transactions. ASU has had to create its own authentication system. ▶

Udell is a consultant and writer in Keene, N.H.

COORDINATING WEB SERVICES

For information on middleware that helps link loosely coupled applications, see **Quick Link: 29439**

For additional Web services resources, visit our Web site: **Quick Link: 29435** www.computerworld.com

Source Code for Successful Services

CASE STUDY

WHO THEY ARE: Consultant and development firm specializing in Web services.

GOAL: To offer cost-effective Linux-based Web services to its clients.

STRATEGY: Use and extend the capabilities of Borland Software Corp.'s Delphi and its Linux cousin, Kylix.

CHALLENGES: The reliability of SOAP messaging is a key challenge for loosely coupled Web services. SOAP, though often transported over HTTP, need not be. Some implementations can transport SOAP over alternate protocols such as file transfer protocol or SMTP. Kazoo Software Inc. President and CEO Alain "Lino" Tadros exploited the openness of Delphi and Kylix to extend SOAP over Microsoft Message Queuing in order to make the asynchronous and transactional features of that protocol available for Kazoo's Web services development projects.

ISSUES: A crucial factor, says Tadros, is access to source code. "I don't like black boxes," he says. "And with the Borland tools, I get 80% of the source right out of the box." For Tadros, the benefits of the Borland tools include a productive integrated development environment, wizards to automate boilerplate coding and a Web-services-oriented debugger that enables the programmer to step through SOAP transactions and inspect or modify messages.

PAYOFFS: Kazoo became the first user of Scotts Valley, Calif.-based Borland's Delphi development tool kit to publish a Web service in the XMethods.net registry.

The close relationship between Delphi and Kylix has enabled Kazoo to offer cost-effective Linux-based services. Tadros says one customer running a Delphi-based service accessed from iPaq handhelds by way of PocketSOAP, a lightweight Component Object Model-based SOAP client, hoped to cut costs by switching its server from Windows to Linux. The service recompiled and ran under Kylix, Tadros says, and now it's hosted under Red Hat Linux using mySQL instead of SQL Server.

Wide-Angle Searching

CASE STUDY

WHO THEY ARE: IT services provider formed in 1999 from the merging of several Israeli companies.

GOAL: To use its expertise with content management technologies from Documentum Inc. in Pleasanton, Calif., and Interwoven Inc. in Sunnyvale, Calif., to develop a multitier document-listing service that supports federated search — that is, the ability to search multiple sources simultaneously.

STRATEGY: Using a beta version of WebLogic Workshop from San Jose-based BEA Systems Inc.

CHALLENGES: Wizards that hack away at the dense underbrush of supporting code are only part of the story. Web services that work robustly can't rely on the synchronous model of HTTP communication, which expects an immediate response to every request.

ISSUES: The tool kit's support for asynchronous and long-running calls, Ness says, does as much for a business developer's productivity as the wizards. Alan Zenreich, the company's director of Web services, amplifies the point: "The coarse-grained and loosely coupled design is best for scalability and availability," he says.

Given the intrinsic unreliability of the Internet as a message delivery mechanism and the stateless nature of HTTP, there's a need to create a "conversational context" for Web services, and WebLogic Workshop addresses that need, Zenreich says. It offers support for fire-and-forget messaging, queuing, registration of callback methods and managed polling for endpoints whose callback addresses are blocked by firewalls.

PAYOFFS: Simplifying Java 2 Enterprise Edition development is a key benefit of the BEA tool kit, according to Ness Chief Technology Officer Joe Fung. Freed from "plumbing" concerns, Zenreich has prototyped a service intended to support federated search. In this scenario, a Web-services-enabled client issues an asynchronous query to a search service that in turn issues asynchronous queries to several different Web-service-enabled document repositories. Maintaining context in each tier means that a client can refine a search without requiring the searcher to requery its sources, and the searcher can assemble results incrementally without waiting for all sources to return complete results.

University's Data Traffic Unsnarled

Texas A&M's XML-based service cuts development time in half and supports real-time transactions. By Julia King

PICTURE A TEAM OF subcootractors at work on a new structure, with each worker needing up-to-date building directions to complete his task. A typical scene, but add this twist: What if the workers spoke different languages, making it impossible for them to understand the same lists of materials and schedules?

Texas A&M University in College Station faced a similar conundrum: It needed to share a wealth of information about students, budgets and payroll — all housed in a legacy Adabas system on a central IBM 390 — with dozens of disparate systems scattered across the university's academic and administrative departments.

"What we had been doing is sharing this information by dumping it into text files and then FTP-ing them all over campus," says Timothy Chester, senior IT manager for the school's computing and information systems division.

For example, files containing student names, their dormitory locations and their class schedules would be electronically transferred to all of the departments that needed the data in their own applications. It worked, Chester says, but as soon as one student swapped classes or changed residence, which happens frequently on a campus of 44,000 students, the files were rendered inaccurate.

How the Technology Works

The answer was to develop a set of XML-based services that take vital information stored on the mainframe, such as current class schedules and students' billing information, and make it available to any and all other computing platforms via the Web.

This was accomplished using Entire X, a set of XML integration tools from Darmstadt, Germany-based Software AG. The tools, which act as data translators, enable software developers at the university to work in a variety of programming languages and incorporate existing code into new Web-accessible applications.

The biggest benefit so far is a 50% reduction in system development time, Chester says. "We wanted to go with XML-based services primarily because they're platform- and programming-neutral," he says. "You get all of the benefits of that, plus you can also support real-time transactions."

One of the first XML-based applications Chester's group developed enables students to register for classes via the Web. It's faster and more accurate than registration through an aging legacy touch-tone telephone system with just 120 lines, says registrar Donald D. Carter.

Chester's team developed a series of scripts and stored them on a Web server. Whenever a student wants to search a class schedule, a request in XML format is executed against the mainframe. The response information is also sent back in XML and is then merged with a style sheet so it can be read via the Web application.

"Entire X sits in the middle, like a traffic cop, accepting incoming messages and routing them where they need to go," Chester says. "We chose it because it supports all of our programming, including Microsoft, Java, tools from HP and Sun, and Linux, too."

ROI

Corporations can learn a thing or two from the Texas A&M implementation.

"You can have a successful system that leverages existing applications, even if those applications are long in the tooth," says Uttam Narsu, an analyst at Giga Informatioo Group Inc. in Cambridge, Mass.

"If what you really need is not new applications but to evoke greater access to those applications, XML and Web services is a viable way to do that," he says.

What's Next

After about a year of development, Texas A&M's new Web-based registratioo system was activated on Nov. 5, 2001, and students used it to sign up for spring classes. Carter says the system cost about $1 million to implement. Since then, it has supported about 3,000 sessions, and students have reported that it's easy to use. So far, Chester says, the IT help desk has received fewer than a half-dozen calls about the Web-based application.

"With the Web, we have a more accurate registration, because students have the visuals right in front of them on the screen," Carter says. "They can see which sections of a class are open and know instantaneously if they can get a seat.

"I've been in this business 36 years, and wheo we went live with this, it was an overwhelming success," he says.

As more students move to the Web to register for classes, Carter says, the plan is to gradually reduce the number of phone lines used for that purpose, thereby significantly cutting the university's communications costs.

"By this time next year, there will be very minimal use of telephone registration," he predicts.

Meanwhile, Chester's group has more plans for similar Web-based services. "We'll use this as a pilot project for other applications, such as students getting their grades online, applying for financial aid and even receiving their award letters — all online," Chester says.

"WE WANTED TO go with XML-based services primarily because they're platform- and programming-neutral," says Texas A&M's Timothy Chester.

Texas A&M University

BUSINESS: Texas' first public institution of higher education opened on Oct. 4, 1876, as the Agricultural and Mechanical College of Texas.

STUDENTS: The university enrolls approximately 44,000 students studying for degrees in 10 academic colleges.

WEB SITE: www.tamu.edu

It's a smart tool to use. And with it, Palm is helping businesses find key solutions for their enterprise. Solutions like mobilizing a sales force. Or streamlining orders. Or providing quick access to information. Along with solutions providers that include BEA, IBM, McKesson, and Siebel Systems, Palm delivers mobile solutions that fit easily into any business. For more on how we've helped deliver results, visit palm.com/enterprise and read our customer success stories and total cost of ownership white paper.

palm™

Screen image is simulated. ©2002 Palm, Inc. All rights reserved. Palm Net is a registered trademark and Palm and the Palm logo are trademarks of Palm, Inc. or its subsidiaries. Other products and brand names may be trademarks or registered trademarks of their respective owners.

KEVIN FOGARTY

Skimping on Java May Prove Painful

I MUST CONFESS to a certain intellectual perversity: a tendency, when listening to people who clearly know what they're talking about, to doubt their conclusions.

In a previous column, I contradicted Paul A. Strassmann, who has written several books dense with econometrics that show that IT provides little or no boost in productivity. I argued that it does by improving the quality, if not the speed, of corporate decision-making. Of course, that was before Enron.

I find myself now doubting the conclusions of recent reports from Illuminata and Gartner, both of which say that end users can save money by developing most Java applications as lightweight Java 2 Standard Edition servlets rather than the more substantive applications that are possible using the full Java 2 Enterprise Edition. Servlets — smallish applications with limited business logic and little back-end connectivity — do the job quite well for most corporate applications, asserts James Governor, author of the Illuminata report "Java on the Cheap."

OPINION

J2EE applications take longer to build; the tool kit itself is a lot more expensive, and most applications not only don't need the extra security and other features of J2EE, but they also run just fine on beefed-up Web servers like Apache Tomcat, which is stable, available and cheap, Governor writes. All true.

But recommending that people use servlets rather than J2EE for all but the most mission-critical applications ignores one major factor in the application development equation: fear.

Vital applications within an enterprise are no longer simply the mission-critical software without which the core business couldn't function. Now they include applications that end users believe they couldn't do their jobs without. Is e-mail mission-critical? It sure is now. Browsers? Yep. Word? You bet.

Think that even inconsequential Web apps aren't vital? Try shutting off instant messaging and you'll lose hundreds of man-hours of productivity just dealing with the complaints.

What's Mission-Critical?

Mission-critical is what *users* think it is. If you build a popular, useful Java app that sits on a $5,000 Wintel server but is "lightweight" because it doesn't launch stored procedures or remote procedure calls or connect through middleware to transaction processors, you'll get just as much grief when someone kicks out the power cord as you would if a half-million-dollar Unix box went out.

And you'll deserve it. Putting useful applications on risky platforms directly contradicts all of today's priorities in application development — most of which involve putting useful, user-friendly front ends on software whose business logic and connections sit on safe, manageable Unix boxes in a data center, where they can be maintained without having to be rebooted every couple of days.

You don't have to overbuild every application just to keep users from whining. Some applications really are inconsequential enough to run as servlets.

But if you're building an application that seriously helps your end users do their jobs, you're selling them and yourself short by not overbuilding it enough to make it reliable, scalable and easily manageable.

Contributing Factors

Governor doesn't agree with me. Neither does Gartner. Neither would anyone who did a rigid ROI analysis of servlets vs. J2EE. But ROI doesn't take into account the cost of users waiting for an unstable servlet, the cost of rebuilding a departmental application that's suddenly in demand throughout the organization, or the long-term cost of managing dozens of local servlets from an operations center that may or may not have the resources to deal with all of them.

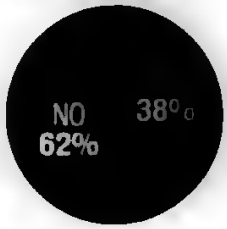
There are ways to save lots of money and time doing Java development, and experts on that can tell you how. But I still can't escape the conviction that no matter how right they are, they're still missing the one nontechnical feature that can keep IT managers out of trouble: the ability to keep end users happy and productive, even if a certain amount of technical overkill is the price you have to pay to accomplish that.

SNAPSHOTS

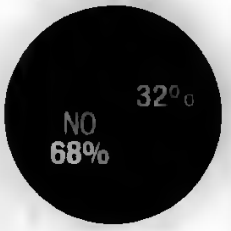
EAI vs. Web Services

Are you investing in Web services?

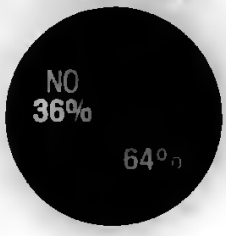
Do you buy enterprise application integration (EAI) software?



Are Web services a threat to EAI vendors?



Do you expect software to eventually be delivered as a service?



BASE: 100 CIOs (75 IN THE U.S., 25 IN EUROPE)

SOURCE MERRILL LYNCH & CO NEW YORK MARCH 2002

Keeping content separate and distinct
has historically been a good idea.

to chaos

VIGNETTE

Are you managing content or managing chaos? Your enterprise could be crippled by its inability to manage information that's locked in silos across your organization. Content Management is no longer an elective Web strategy. Vignette has helped leaders like The Wall Street Journal Online, J. D. Edwards, T. Rowe Price, Sun Microsystems and many others unify their Web strategy. Find out how Vignette can help your business initiative today by requesting the "Best Practices" CD at www.vignette.com/silos.

Safer Than You Think?

Security for Web services isn't so bad — if you don't have many secrets or you're willing to spend a lot. By Robert L. Scheier

SECURITY IS THE No. 1 factor keeping many IT managers from deploying Web services. But don't tell that to Matt Hird, director of IT at Superior Information Services LLC.

Hird relies on well-known, proven security protocols, such as virtual private networks (VPN) and Secure Sockets Layer (SSL), to protect bankruptcy, real estate and other public information Superior provides to its customers using Web services. Hird says the Trenton, N.J.-based informatioo broker considered more elaborate security safeguards but decided "the business risk isn't there to justify the investment."

Many IT managers afraid to expose their Web services to the outside world until new security standards are firmly in place are deploying Web services only within their firewalls. But some IT managers are moving Web services beyond the firewall, especially to handle relatively low-risk transactions with trusted business partners.

Other Web services pioneers are very large companies that need to provide secure access to critical systems and can afford the specialized tools and skills required to secure Web services before standards-based Web security tools emerge sometime next year.

Web services refers to the use of Web-based standards such as XML; Universal Description, Discovery and Integration; and Simple Object Access Protocol to link applications running oo different platforms.

Unlike previous approaches that required custom coding or expensive middleware to link individual applications, Web services aim to expose key functionality within applications (such as the ability to see the balance in your checking account or to place an order from a factory) to other applications as required when business needs change.

But this ease of integration also brings risks. When a Web service connects you to a business partner, you rely on that business partner to properly authenticate, or vouch for the identity of, users at their end of the transaction. That means an intruder who has gained access at a supplier, for example, could use that improper authentication to invade systems of the supplier's customers.

To prevent such break-ins, Web services architects must look beyond application-level security measures and create access control, authentication and encryption capabilities, which can follow queries and responses as they cross system and corporate boundaries.

Continued on page 42

Securing Web Services

Until more tools and standards are available for Web services security, IT managers should:

- Insist on Web services platforms that comply or will comply with key standards when they emerge.
- Do a better job securing critical parts of the existing IT infrastructure, such as servers and databases, so they're prepared for a Web services world.
- Constantly weigh the risks against the benefits of deploying external Web services with current security tools.

PEP MONTGOMERY

Go ahead.
ing for you.
on earth. We
with the mos
ed server, yo
company more IT people trust than any other
of NTT Communications, the world's largest
thousands of dedicated servers and support
ive tech staff in the industry. When you have an
dedicate your time to more important things.

$199mo > DEDICATED SERVER
No set-up fees

NTT/VERIO

Continued from page 40

Web services security standards aim to do that by building security into key Web services protocols such as XML. The XML Key Management Specification will define how to register and distribute XML-based public keys to encrypt and decrypt documents, even if the sender and recipient have never done business with each other before.

The Security Assertion Markup Language will use XML to exchange information about which users have been authenticated and what data they are authorized to see.

Risks vs. Benefits

John Pescatore, an analyst at Stamford, Conn.-based Gartner Inc., argues that such standards, along with development tools and applications, "will be immature from a security perspective" until the second half of next year. For that reason, he recommends that all but the most aggressive firms run Web services only within the firewall until then.

Others take a more flexible view. Rather than use the inside-the-firewall rule, Pete Lindstrom, an analyst at Hurwitz Group Inc. in Framingham, Mass., recommends that companies deploy Web services wherever they or trusted business partners have provided enough security to the required networks, applications and databases that the business benefits outweigh the risks.

Consider Networkcar Inc., which uses a wireless transmitter in cars and trucks to send real-time location and performance information to customers such as fleet managers, dealerships and auto clubs. The San Diego-based company uses Web services based on San Jose-based BEA Systems Inc.'s WebLogic Server to share data with its customers.

It relies on the well-known SSL and the HTTP over SSL encryption protocols to protect content in transit, as well as a firewall around its database to handle authentication and authorization, says Wade Williams, a senior developer at Networkcar.

This is about the same level of security as on many conventional Web applications, which is fine, says Williams, because the data he's providing over Web services is the same the company used to provide over its intranet.

But if Networkcar were to share more sensitive data, such as customers' credit card numbers, it would have to revisit whether Web services are secure enough and what other security mechanisms, such as public- and private-key encryption, to add to the mix, he says.

Superior went through a similar process in deciding that SSL and VPNs were good enough to secure the Web services it's providing using BEA's WebLogic. While a central authentication server would do a better job of keeping out unauthorized users, "the worst that can be done is that someone else could imitate" one of Superior's customers, Hird says. Superior would learn of the fraud when it billed the actual customer for the transaction and the customer refused to pay.

Even then, according to Hird, Superior would have lost only potential revenue rather than actual cash. "It's an acceptable risk because of what we're doing," he says. "If we were the CIA, that probably wouldn't be acceptable."

Hird also weighed the risks against the benefits. By using Web services, he says, Superior can develop new applications 100% faster and expand into new business areas, such as syndicating its data to business partners.

E2open LLC, a global collaboration network formed by global electronics giants such as IBM, Matsushita Electric Corporation of America, Lucent Technologies Inc. and Nortel Networks Ltd., is one of the advanced companies that both needs and can afford secure Web services today.

E2open handles and even stores trade secrets such as new product designs for its customers, so "security is No. 1," says Greg Clark, chief technology officer at the Belmont, Calif.-based organization. But without Web services, he says, the cost to integrate applications for its founders "was way too high."

To keep those Web services secure, the consortium is using Austin, Texas-based Tivoli Systems Inc.'s Access Manager (formerly Tivoli Policy Director) to store the access control rules for users, Clark says. Access Manager also provides a single sign-on capability, which allows an E2open user to sign on once and access the appropriate information through different applications at multiple E2open companies.

Using the Right Tools

Clark acknowledges that a tool such as Tivoli Policy Director is appropriate today only for organizations where the need to integrate business partners justifies the current cost of securing Web services. Other leading players in the Web services security market include Netegrity Inc. in Waltham, Mass., Novell Inc., Entrust Inc. in Dallas, and Oblix Inc. in Cupertino, Calif.

Major vendors promoting Web services are also banding together to form Web services security standards. Last month, Microsoft Corp., IBM and Mountain View, Calif.-based VeriSign Inc. announced that they will create a new standard for Web services security called WS-Security. But a Microsoft spokesman says it will take 12 to 18 months to complete all the specifications called for by the standard.

Until more standards-based security tools hit the market, IT managers should weigh the risks of deploying Web services against the benefits. "To the extent you have a controlled environment across the firewall, then go for it," says Lindstrom, "as long as you're constantly evaluating and re-evaluating the risks." ❶

Scheier is a freelance writer in Boylston, Mass. He can be reached at rscheier@charter.net.

> [Deploying Web services is] an acceptable risk because of what we're doing. If we were the CIA, that probably wouldn't be acceptable.
>
> **MATT HIRD, DIRECTOR OF IT, SUPERIOR INFORMATION SERVICES**

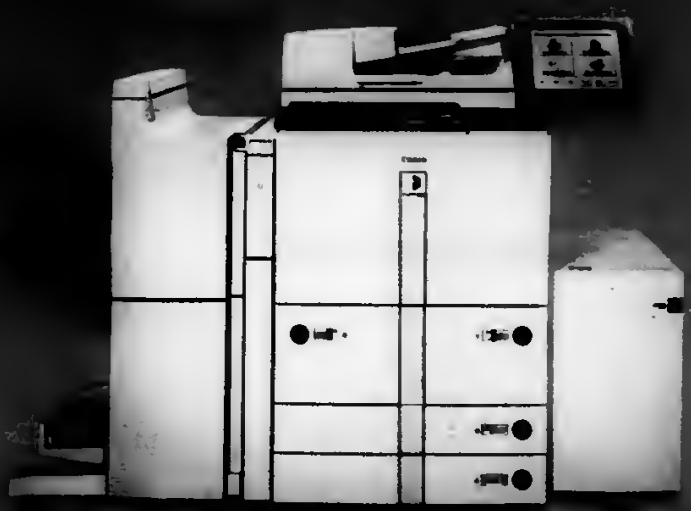
MICHAEL BRANSCOM

TOP VENDOR STRATEGIES

Find out how Microsoft, IBM, BEA and Sun plan to bolster the security of Web services.

QuickLink: 29013
www.computerworld.com

imageRUNNER™



ANYWARE™

OR

OR

Canon KNOW HOW™

Extreme Integration

These brave users are trying to integrate legacy systems that were never meant to integrate with anything. By Michael Meehan

EARLY enterprise application integration (EAI) mostly involved gluing together various vendors' applications. The EAI vendor sent you an adapter for your enterprise resource planning module and your e-commerce application and voilà! They began sharing data.

Now users are looking to take a leap into the scary world of integrating homegrown applications and systems that have one foot in the tar pits. No vendor builds out-of-the-box products to do this, meaning users will be responsible for much of the work.

"You've got to make sure you pick a vendor who will work with you, because chances are that you're attempting something they've never done before," says John Stroker, director of information and planning at Palace Resorts Inc. in Miami. "At least nothing exactly like it."

What users are finding is that such work can be done, but it requires patience and careful planning. The companies profiled here and on page 46 are tackling what might be considered next-generation EAI.

ADDITIONAL RESOURCES

For more information on EAI, visit the following Web sites:

- www.eaijournal.com
- http://eai.ittoolbox.com
- http://eai.ebizq.net/
- www.metagroup.com/metaview/mv0145/mv0145.html

Brainpower Required

Motorola Inc. Chief Technical Officer Toby Redshaw puts "smart people to do the work" at the top of his integration checklist.

Motorola has a huge EAI implementation base. "We've got somewhere in the low four digits of adapters and connectors set up," Redshaw says. "We can make what I call the eight-minute egg. It takes us eight minutes to create the adapter/connector in most cases, and it takes a good staff to do it."

Yet some eggs take longer to cook, and that's when it pays to have a few master chefs on the premises.

Much of the order-entry information for Motorola's pager manufacturing unit was written using software from now-defunct FourGen Software Inc. and housed on an Informix database. Motorola wanted to integrate that data with its Java-coded Unit Personality Data warehouse, which contains the passwords and permissions for the company's employees.

IT staffers had used Java Native Interface for the personality data warehouse, which would allow it to interoperate with applications coded in C, C++ or assembly language.

"Unfortunately, FourGen objects don't act like C objects," says Motorola IT architect Seshu Duvvapu. And Motorola's EAI vendor, Fairfax, Va.-based webMethods Inc., didn't have an out-of-the-box adapter for the FourGen objects.

The only way Duvvapu was going to get the job done was to find different code. The FourGen applications were running Hewlett-Packard Co. Unix servers, so Duvvapu decided to compile the FourGen code using Unix Object Code.

Once he did that, he linked it to the webMethods integration broker and tied in the paging business systems with the rest of Motorola's IT infrastructure.

"For years, the FourGen system was a complete silo," Duvvapu says. The project took two months to complete because Duvvapu had to make sure the FourGen applications shared the correct information with other applications. "But once you get it to the integration layer, it's fairly easy," he says.

EAI manager Charles Soto says the adapters and connectors shuttling between Motorola's applications have changed the way the IT organization works.

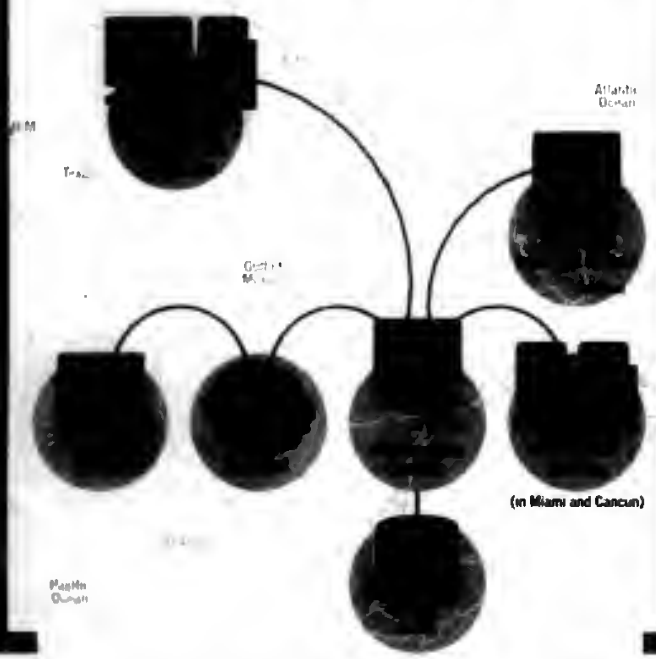
"Now we're talking more about consolidation and integration instead of having to turn the world upside down," he says. "It saves a lot of time and money if you don't have to rebuild everything."

More profiles on page 46

Continued from page 44

Going the Distance

Miami-based Palace Resorts connected legacy systems and a Sabre database in Fort Worth to a new Web-accessible reservation system in Cancun.



Crossing Boundaries

When Palace Resorts wrote its initial hotel booking and yield management applications in 1985, Web access wasn't on the priority list. The company wrote the applications for its eight hotels in Cancun, Mexico, using Miami-based Data Access Corp.'s DataFlex Unix programming language.

But Web access was essential in 2001 when the hoteler wanted to create hotel and airfare travel packages for its guests. That meant unlocking the Unix-based information at three locations in Cancun and a central server farm in Miami. In addition, Palace needed to link to Fort Worth, Texas-based Sabre Inc.'s global travel distribution database to find airfares.

Palace Resorts Inc

"We not only had to coordinate all these applications in real time, but we had to do it over distance," says John Stroker, director of information and planning at Palace Resorts.

He also didn't have millions of bucks to throw at the project, he adds.

"If we had to go back and look at changing our legacy systems, it would have driven the cost way out of sight," he says. "The reality of our business is that it relies on handwritten applications, and we need to find ways of extending those applications."

Stroker chose an update of the old screen-scrape. Using the OnWeb product from Cupertino, Calif.-based NetManage Inc., Palace reached into its Compaq Computer Corp. ProLiant servers, grabbed the appropriate room-availability, pricing and customer loyalty numbers and then converted them into HTML Web pages.

"Once you get the information to your Web server, you're fine," Stroker says. "Then it's just a matter of writing rules and presenting it."

He underscores that real-time data is the trick. "We can't afford to create [resort] packages with bad or dated information," Stroker says. "That's asking for trouble."

The system even determines whether the customer is a tour operator and then selects the appropriate Cancun- or Miami-based legacy server from which to draw the information.

The project took nine months to complete, and the new Web-booking system went live in October last year. Stroker says he expects to see a return on the project's $900,000 investment within 18 months.

Back to the Future

Take the following ingredients:

- A 15-year-old IBM 3090 mainframe housing a Siebel Systems Inc. customer information system.
- A 7-year-old Sybase Inc. database for sales orders.
- An Oracle8i order-entry system for the call center, with a Web interface built on Microsoft Active Server Pages.

Instructions:

- Fuse into a single ordering and customer information system that can also be extended to cover distributor sales.

That's the project that faced telecommunications provider Cable & Wireless USA Inc.'s IT department. To add to the complication, "the people who developed those legacy systems are no longer here," says T. Minh Tran, senior IT director.

Cable & Wireless USA Inc

Ultimately, the job required multiple data transformations and the ability to process hundreds of data requests almost instantaneously.

Using the EAI broker from webMethods Inc., the Cable & Wireless IT team figured out a way to work with two parallel back ends at once.

The first step was to build a Java-based order-entry form that mirrored the mainframe order-entry form.

The next step was to get the information to the EAI layer. Brad Allen, a senior systems analyst, says the team built a Dynamic Link Library (DLL) in Component Object Model (COM) so the front end could speak with the webMethods transformation engine.

"But you can't expose a DLL to Java," he says. So embedded within the COM objects was a webMethods client that provided hooks to Java application program interfaces.

Then came the tricky part. Once a data packet hits the central order-processing servers, the system needs to determine where to send that packet.

Information headed to the mainframe needs to be retranslated for socket-based messaging while other databases process Java Developer Byte Code.

"The broker has nodes that transmit to other brokers," says IT scientist David Green. "The idea is to push through the proper information using your legacy procedure, but to separate out the complexity of your legacy procedure for the people using the system."

Green describes the webMethods layer as a shield that protects those using the Web pages from the peculiarities of the legacy system.

Yet nothing shields the IT department. Green notes that integration projects create tons of traffic behind the firewall. "A simple order will generate about 100 transactions," he says. "A larger order can generate upwards of a thousand."

That creates the need to monitor everything in the IT architecture. A webMethods event tracker can be used to follow event traffic on various servers, but that doesn't cover network traffic or the I/O capability of the mainframe. "We've just built it, and we're really still learning how to monitor the system," Green says. "You can imagine the complexity of what's going on when something goes wrong."

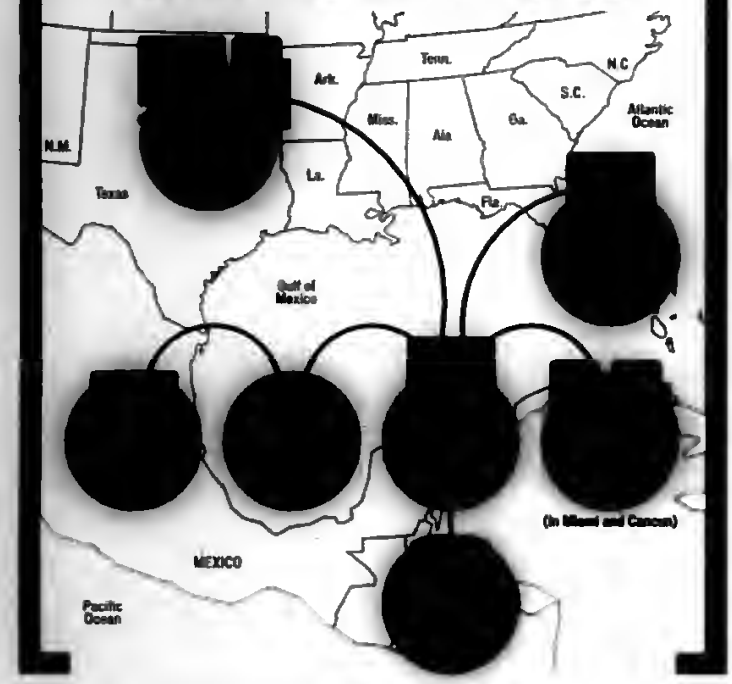
Yet Tran says that such integration projects are the only way his team can justify the expense of adding new applications to Cable & Wireless' business.

"We can't afford to build systems that don't work with our legacy [systems] anymore," he says. "There are a lot of revenue-generating systems that we still have, and we need to figure out ways to keep using them."

Continued from page 44

Going the Distance

Miami-based Palace Resorts connected legacy systems and a Sabre database in Fort Worth to a new Web-accessible reservation system in Cancun.



Crossing Boundaries

When Palace Resorts wrote its initial hotel booking and yield management applications in 1985, Web access wasn't on the priority list. The company wrote the applications for its eight hotels in Cancun, Mexico, using Miami-based Data Access Corp.'s DataFlex Unix programming language.

But Web access was essential in 2001 when the hotelier wanted to create hotel and airfare travel packages for its guests. That meant unlocking the Unix-based information at three locations in Cancun and a central server farm in Miami. In addition, Palace needed to link to Fort Worth, Texas-based Sabre Inc.'s global travel distribution database to find airfares.

"We not only had to coordinate all these applications in real time, but we had to do it over distance," says John Stroker, director of information and planning at Palace Resorts.

He also didn't have millions of bucks to throw at the project, he adds.

"If we had to go back and look at changing our legacy systems, it would have driven the cost way out of sight," he says. "The reality of our business is that it relies on handwritten applications, and we need to find ways of extending those applications."

Stroker chose an update of the old screen-scrape. Using the OnWeb product from Cupertino, Calif.-based NetManage Inc., Palace reached into its Compaq Computer Corp. ProLiant servers, grabbed the appropriate room-availability, pricing and customer loyalty numbers and then converted them into HTML Web pages.

"Once you get the information to your Web server, you're fine," Stroker says. "Then it's just a matter of writing rules and presenting it."

He underscores that real-time data is the trick. "We can't afford to create [resort] packages with bad or dated information," Stroker says. "That's asking for trouble."

The system even determines whether the customer is a tour operator and then selects the appropriate Cancun- or Miami-based legacy server from which to draw the information.

The project took nine months to complete, and the new Web-booking system went live in October last year. Stroker says he expects to see a return on the project's $900,000 investment within 18 months.

Back to the Future

Take the following ingredients:

- A 15-year-old IBM 3090 mainframe housing a Siebel Systems Inc. customer information system.
- A 7-year-old Sybase Inc. database for sales orders.
- An Oracle8i order-entry system for the call center, with a Web interface built on Microsoft Active Server Pages.

Instructions:

- Fuse into a single ordering and customer information system that can also be extended to cover distributor sales.

That's the project that faced telecommunications provider Cable & Wireless USA Inc.'s IT department. To add to the complication, "the people who developed those legacy systems are no longer here," says T. Minh Tran, senior IT director.

Ultimately, the job required multiple data transformations and the ability to process hundreds of data requests almost instantaneously.

Using the EAI broker from webMethods Inc., the Cable & Wireless IT team figured out a way to work with two parallel back ends at once.

The first step was to build a Java-based order-entry form that mirrored the mainframe order-entry form.

The next step was to get the information to the EAI layer. Brad Allen, a senior systems analyst, says the team built a Dynamic Link Library (DLL) in Component Object Model (COM) so the front end could speak with the webMethods transformation engine.

"But you can't expose a DLL to Java," he says. So embedded within the COM objects was a webMethods client that provided hooks to Java application program interfaces.

Then came the tricky part. Once a data packet hits the central order-processing servers, the system needs to determine where to send that packet.

Information headed to the mainframe needs to be retranslated for socket-based messaging while other databases process Java Developer Byte Code.

"The broker has nodes that transmit to other brokers," says IT scientist David Green. "The idea is to push through the proper information using your legacy procedure, but to separate out the complexity of your legacy procedure for the people using the system."

Green describes the webMethods layer as a shield that protects those using the Web pages from the peculiarities of the legacy system.

Yet nothing shields the IT department. Green notes that integration projects create tons of traffic behind the firewall. "A simple order will generate about 100 transactions," he says. "A larger order can generate upwards of a thousand."

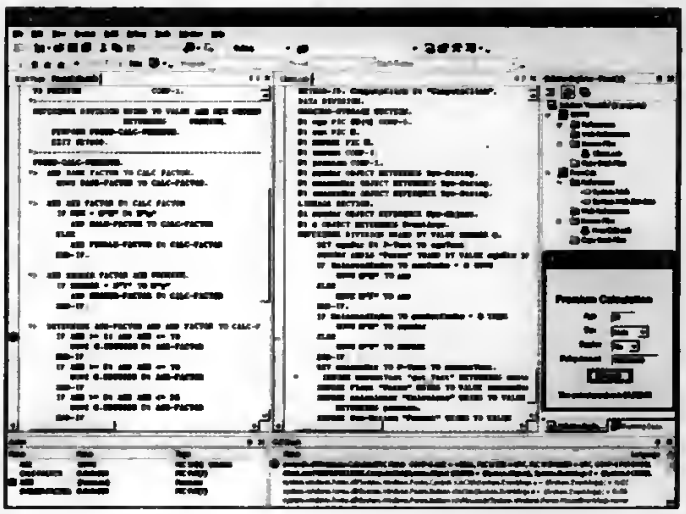
That creates the need to monitor everything in the IT architecture. A webMethods event tracker can be used to follow event traffic on various servers, but that doesn't cover network traffic or the I/O capability of the mainframe. "We've just built it, and we're really still learning how to monitor the system," Green says. "You can imagine the complexity of what's going on when something goes wrong."

Yet Tran says that such integration projects are the only way his team can justify the expense of adding new applications to Cable & Wireless' business.

"We can't afford to build systems that don't work with our legacy [systems] anymore," he says. "There are a lot of revenue-generating systems that we still have, and we need to figure out ways to keep using them."

COBOL's not the odd man out anymore.
So what's your strategy for leveraging your legacy assets?

Are you ready to move into the .NET future? Don't leave your COBOL behind. Introducing NetCOBOL for .NET, the first and only COBOL to be fully integrated into Microsoft's .NET Framework and the Visual Studio .NET environment. NetCOBOL for .NET facilitates an ideal synergy of the strengths of COBOL, including its maintainable code, business logic, and data structures, with the power and flexibility of the managed .NET Framework.



With NetCOBOL for .NET you get:

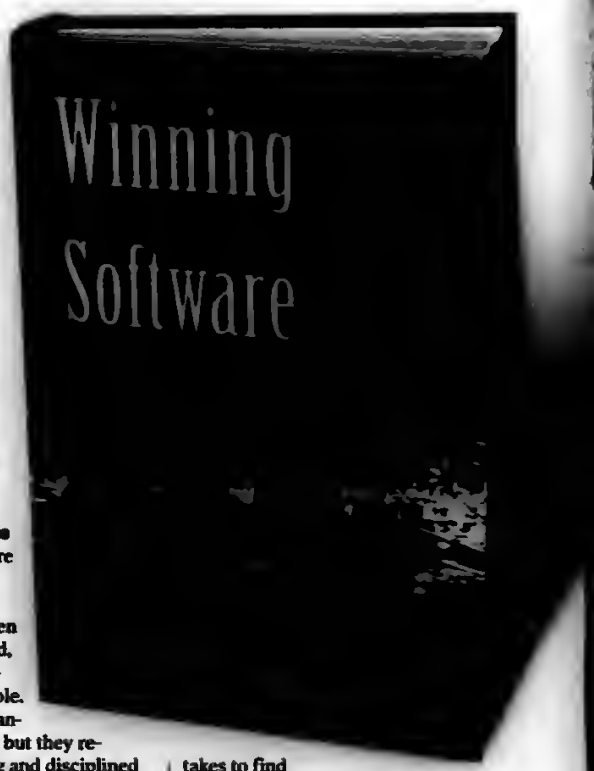
- The ability to create COBOL applications using the latest technologies - XML Web services, ASP.NET Web applications, rich client Win Form applications
- An award-winning development environment (Visual Studio .NET) that is designed for creating .NET applications
- Direct and straightforward access to new technologies (e.g., inheritable classes and callable API's) offered in the Microsoft® .NET Framework
- Integration of your legacy COBOL code with any other .NET language application
- Easier access to system services via Microsoft class libraries
- Simplified database access (ADO.NET, EXEC SQL)

Call us today at either (800) 545-6774 or (408) 428-0300 or send an email to cobol@adtools.com. In-depth information about NetCOBOL for .NET can be found at **www.netcobol.com**. Get a **FREE copy of Visual Basic for .NET** when you purchase NetCOBOL for .NET by June 30, 2002! (Offer code: KE52)

FUJITSU

THE POSSIBILITIES ARE INFINITE

BOOK EXCERPT



A software guru's message to executives: Your application development group can be a competitive asset — or a business disaster. By Watts S. Humphrey

Why Quality Pays

WHILE TECHNOLOGY can change quickly, getting your people to change takes a great deal longer. That's why the people-intensive job of developing software has had essentially the same problems for over 40 years. It's also why, unless you do something, the situation won't improve by itself.

In fact, current trends suggest that your business will become even more dependent upon ever-more-complex software. This means that more of your people will work on software and that their work will be harder to track and more difficult to manage. Unless you make some changes in the way your software work is done, your current problems will likely get much worse.

The quality of software, its usability, and its timely development are critical to just about everything businesses do. The speed with which your people develop software can put you ahead of or behind your competitors. Software problems may have been frustrating in the past, but mismanaged software can now be fatal to a business. If your people don't produce quality software, testing times will be excessive, schedules will slip, customers will be unhappy, and revenue will drop.

To manage a software-intensive business, you must observe three management principles:

1. Recognize that you're in the software business. A senior vice president at Citibank once told me "we are a software business masquerading as a bank." It follows, then, that if you can't manage software, you'll have trouble managing your business. For example, delays in a software schedule can delay the delivery of new products and thus affect cost, revenue and profit.

2. Quality must be the top priority. In software work, quality problems overwhelm everything else. When quality isn't managed, entire software projects are unmanageable. There are ways to manage software quality, but they require proper training and disciplined software-engineering methods.

3. Quality software is developed by disciplined and motivated people. Software development is intellectual work, and undisciplined or unmotivated people can't do timely or predictable work.

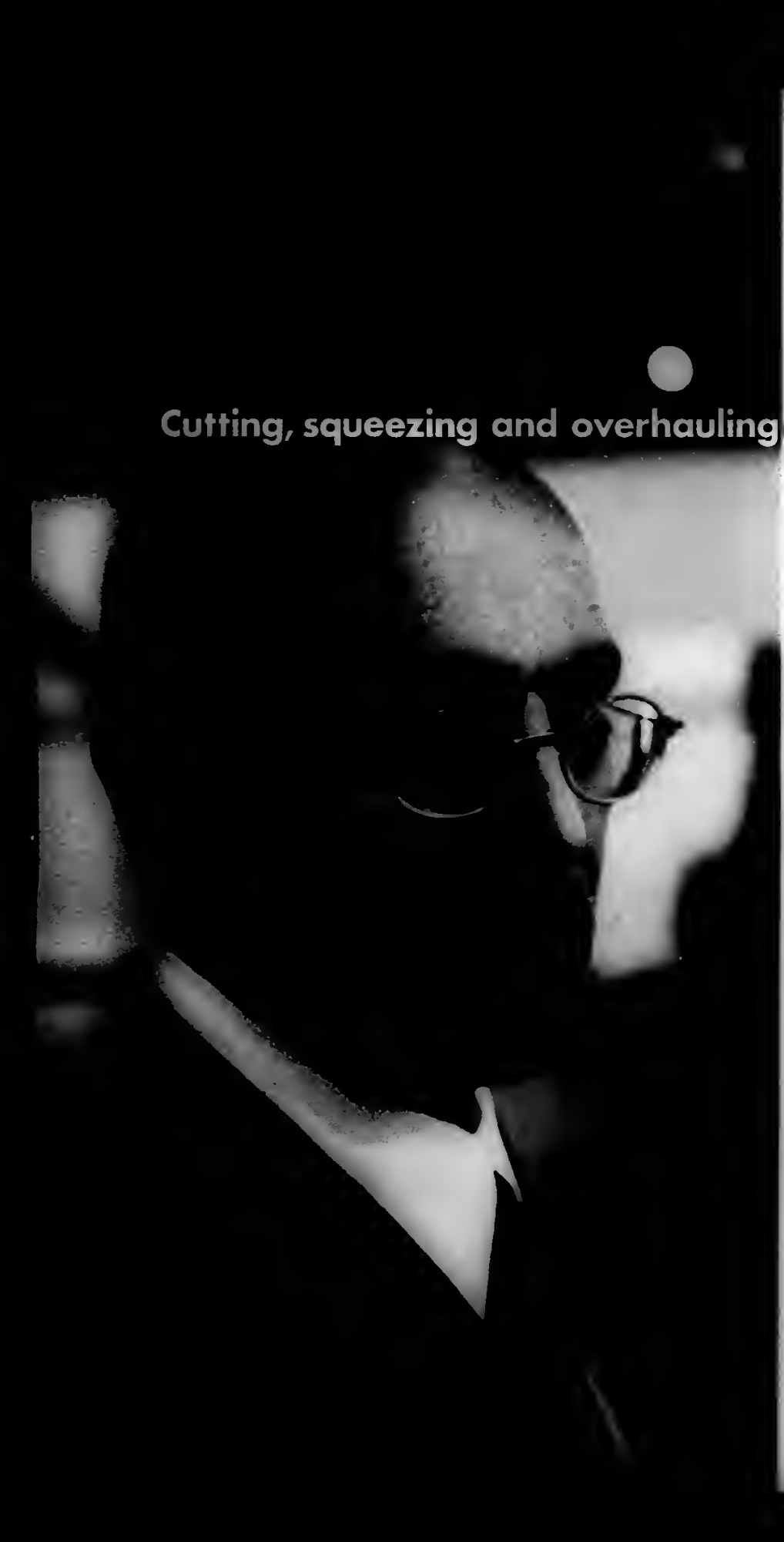
In deciding how to manage software quality, consider these facts. First, while developing programs, even experienced software engineers inject one defect in about every 10 lines of code. The programmers aren't incompetent or lazy — they're just human. All humans make mistakes, but in software, these mistakes result in defects. This means that a modest-size program of 100,000 lines of code typically would start with about 10,000 defects.

The second key fact about software quality is that the cost of finding and fixing defects increases at every step in the development process. For example, Xerox Corp. measured the time it takes to find and fix a defect at each stage:

- **Code reviews**, in which programmers analyze their own programs: three minutes.
- **Code inspections**, in which several programmers look for problems: 25 minutes.
- **Module testing**, in which programmers test small program modules: 32 minutes.
- **System testing**, in which the modules are combined so the whole system is tested: 1,400 minutes.

To appreciate the significance of these times, consider the time required to find and fix 10,000 defects. Using the Xerox data, the defect-removal time would be 500 hours for code reviews, 4,170 hours for inspections, 5,330 hours for module testing and 234,000 hours for system testing. Note that 234,000 hours is over 100 engi-

Continued on page 50



Cutting, squeezing and overhauling budgets have always been the toughest part of your job. But you now find those skills being tested like never before when challenged to reduce infrastructure costs without risking your long-term business objectives.

HP Services can help: thousands of infrastructure specialists who have provided IT operations for hundreds of companies around the world. People who work with you to address virtually every aspect of your infrastructure. From streamlining operations to reducing overhead to simplifying processes. All while ensuring that the solution is flexible enough to evolve with your changing needs.

That's because our outsourcing solutions always start with you—your issues, your people, your challenges. So we can take on entire operations or parts of operations depending on the specific business goals you hope to achieve.

HP infrastructure solutions are engineered for the real world of business. Because the last time we checked, that's where we all work. *Call 1.800.HPASKME, ext. 246. Or visit www.hp.com/go/infrastructure.*

Infrastructure: it starts with you.

Why Quality Pays

Continued from page 48

neering-years of work. Clearly, selecting the proper defect-removal method makes a big difference in both software development time and costs.

The third key fact about software quality is that the person who developed the program is the one best able to find and fix its defects. This review takes about an hour for every 100 lines of code. Programmers who do careful reviews typically find and fix five to 10 defects per hour. Therefore, counting review time, the average defect-removal time in code reviews is six to 12 minutes per defect. With code reviews, the engineers can find and fix 10,000 defects in about 1,000 hours instead of about 4,000 hours with inspections, 5,000 hours with module testing or over 200,000 hours in system testing.

The reason testing takes so long is that a test reveals only the symptoms of a problem. Then the engineers must determine where the problem is in the system and its underlying cause. This is particularly difficult when there are multiple problems. Then the engineer must isolate the symptoms for each problem, identify the troublesome module, find the mistake and then fix it. After each defect is fixed, the fix must be installed in the system and the system retested. Because each of these steps can take an engineer an hour to a week or more, the time to find and fix a few hundred defects can be many months. This makes it hard to predict how long a project will take.

Not only does system testing take longer; it still produces software with lots of defects. The inspection strategy takes half the time and leaves less than half as many defects, while the review strategy takes a quarter of the time and leaves one-eighth as many defects.

Since code reviews by programmers are so effective, you might wonder why everyone doesn't use them. The reason is that good code reviews require disciplined methods and special training. The programmers must gather defect data and use the data to help them find and fix the defects. Because people tend to make the same mistakes repetitively, the data shows programmers what kinds of defects to look for. With few exceptions, programmers aren't trained in such quality methods and don't believe that reviews and defect data would help them.

Why not? It's because of the way they've been trained and managed. Starting with their first programming courses, they learn that the most admired programmers produce code at lightning speed and fix defects in testing. This fix-it-later attitude fosters poor practices. To get quality work, you must change this culture.

Fortunately, there are techniques for changing the culture and managing software projects. I developed two methodologies for the Software Engineering Institute:

- **Personal Software Process**, which replaces code-and-fix methods with a disciplined process that helps individual programmers learn about the quality of their work — without slowing them down.
- **Team Software Process (TSP)**, which builds motivated teams of programmers who track and manage the quality of their work and who are rewarded for doing quality work.

Companies that have adopted these methods dramatically reduce testing time and produce what is essentially defect-free software — on schedule or ahead of schedule — while reducing employee turnover. It takes about two years for the benefits to exceed the cost of implementation (mostly the cost of training).

When Boston-based Teradyne Inc. adopted the TSP, for example, its previous rate of 20 defects per thousand lines of code was reduced to one defect, and the company saved $5.3 million in the first two years. As a Teradyne manager once told me, "With the TSP, we're so far ahead of the competition that nobody will ever catch us." ▶

Humphrey is a fellow at the Software Engineering Institute at Carnegie Mellon University, where he led the Capability Maturity Model effort and other work to improve software development. This article is adapted, with permission, from Winning With Software: An Executive Strategy *(Addison-Wesley, 2002).*

ADDITIONAL RESOURCES

A description of the Personal Software Process:
www.sei.cmu.edu/tsp/psp.html

An overview of the Team Software Process:
www.sei.cmu.edu/tsp/tsp.html

Why Projects Fail

Two questions have often bothered me about software work. **First, why do competent software professionals agree to completion dates when they have no idea how to meet them? Second, why do rational executives accept schedule commitments when the engineers offer no evidence that they can meet those commitments?** Where software is concerned, many otherwise hardheaded executives willingly accept vague promises and incomplete plans. Management's undisciplined approach to schedule commitments contributes to every one of the five most common causes of project failure:

1

UNREALISTIC SCHEDULES

You might think that pushing for an aggressive schedule would accelerate the work, but it actually delays it. When faced with an unrealistic schedule, engineering teams often behave irrationally. They race through the requirements, produce a superficial design and rush into coding. This mad scramble to build something – anything – results in a poor-quality product that has the wrong functions, is seriously defective and is late.

2

INAPPROPRIATE STAFFING

The only way to complete an engineering project rapidly and efficiently is to assign an adequate number of people and then protect them from interruptions and distractions. This helps build the motivation and effective teamwork needed for quality results. When managers fail to provide timely, adequate and properly trained resources, their projects will generally fail.

3

CHANGING REQUIREMENTS DURING DEVELOPMENT

To start designing and building products, engineers must know what product to build. Unfortunately, management, marketing and even customers often don't know what they want. Worse, they think they know and then change their minds partway through the job. While the requirements (or objectives) normally change in the early phases of a job, there's a point beyond which changes will waste time and money and disrupt the work.

4

POOR-QUALITY WORK

Consider the case of Greg, manager of a manufacturing software project that had to meet an accelerated delivery date set by his boss. Greg unmercilully pushed his engineers, who rushed through the design and coding and skipped all of the quality reviews and inspections. Testing found many defects, but Greg argued for delivering the software and fixing defects later. Greg met the deadline, but the system was a disaster. It was so unreliable that the software had to be fixed every time a change was made in the product or product mix. Excessive factory downtime and repairs cost the company over $1 million. When executives push for unrealistic schedules, the project either will be late in delivering a working product or will produce a product that doesn't work. There's a saying about software quality: "If it doesn't have to work, we can build it really fast."

5

BELIEVING IN MAGIC

Commercial off-the-shelf software, or COTS, is an attractive way to save development time and money. But COTS isn't a silver bullet. If not properly managed, it can be a disaster. A COTS product that works perfectly in demonstrations, for example, may crash when subjected to different hardware configurations, higher data rates or even data-entry errors. You must test the product thoroughly enough to expose previously untested conditions. If the program is troublesome when stress-tested, it will almost certainly be troublesome when used in production.

– Watts S. Humphrey

Word on the Street: Migrate to Linux.

On Wall Street, technology performance means money. That's why Red Hat® Linux® and Compaq *ProLiant*™ servers quietly power many of the world's top financial firms.

No wonder. Linux is open source. You can see the code. You stay in control. And you won't get trapped again by proprietary technology.

Red Hat Linux Advanced Server is the enterprise platform for UNIX to Linux migration. Scalable performance. Stabilized releases. Support from top software vendors you already use.

Red Hat and Compaq — enterprise-ready, no matter what street you're on.
Go to www.redhat.com/explore/thestreet

COMPAQ redhat

Hot Java!

What you need to know to land a job and keep your skills fresh in the Java development field. By Steve Ulfelder

Employee Spotlight

Name: HERB BERGER
Title: Advanced technology group manager
Employer: Limited Technology Services Inc., the IT arm of retailer The Limited Inc. in Columbus, Ohio
Current IT staff: About 750
Now seeking: The Limited has openings for about a half-dozen Java programmer/analysts and senior programmer/analysts. "Java has become much more mainstream [in] the past two years," Berger says. "It's almost easier to find Java people than C++ people now."
Reason: In the past two years, The Limited has consolidated operations and created Limited Technology Services. "We had to identify core technologies so we could get more reuse, and Java and J2EE [Java 2 Enterprise Edition] certainly qualify," Berger says. The centralized IT organization has a 40-member internal Java user group that makes decisions about how and when to publish objects for reuse, for example.

CAREERS

The Limited has two hot Java projects right now. First, the company is changing e-commerce platforms for its Victoria's Secret Web site, one of the world's busiest e-commerce sites. The site was built using IBM's Net Commerce platform. The Limited recently evaluated a revamped version of Net Commerce, as well as BEA Systems Inc.'s suite. (San Jose-based BEA got the nod.) The changeover is keeping many staffers busy.

In addition, the retailer has launched a project known internally as the Integrated Brand Delivery Initiative. This ambitious program, which uses Java underpinnings, combines an upgrade of in-store register systems with new performance and scheduling tools.

– Ulfelder is a freelance writer in Southboro, Mass. Contact him at sulfelder@yahoo.com

"IT'S ALMOST EASIER to [illegible] Java people now," says Herb Berger, [illegible] Limited Technology Services.

Is It Hot?

MARKET: A 2001 survey by Palo Alto, Calif.-based Devx.com Inc. found that U.S. Java developers earn an average of $83,000, making them some of the highest-paid specialists in IT. Pay in the Northeast was highest, at $103,561. Southern California was next at $93,875.

DEMAND: "Yes, there is a market now [for Java experts]," says Kevin Rosenberg, managing director at Bridgegate LLC, a technology search firm in Irvine, Calif. "But before that happened developers needed to shed the attitude of 'the world needs me.' As soon as developers became pragmatic about their value, the market started to stir."

Best Place

■ An investment management company that offers mutual funds and other financial products and services to individual and institutional investors.

■ Ranked No. 82 on *Computerworld*'s 2002 Best Places to Work in IT list.

The Vanguard Group Inc.
Valley Forge, Pa.
[illegible]

2001 revenue: Vanguard is privately held, with more than $580 billion under management in its 106 U.S. funds.

Number of IT workers: 2,700, 700 to 800 are involved in Java programming.

How it hones staff skills: "To recruit and retain great Java engineers, you need competitive compensation," says Jeff Dowds, principal of direct investor systems at Vanguard. "We pay our crew well."

Vanguard also offers (and pays for) comprehensive training – about 20 courses in XML, HTML, JavaScript, Perl and other Java-related technologies.

Dowds says Vanguard's best retention tool is its commitment to advanced technologies. "If you want to attract the best people, you need to be working with the tools that appeal to them," he says. "We exploit browsers and application servers, and we're heavily object-oriented – for anyone in the IT business, that's what they want to work on."

JAVA CERTIFICATION DEBATE

Find out why classroom training in Java development doesn't impress some employers.

QuickLink: 29401
www.computerworld.com

Skills

■ Get "deep development" Java skills. Employers prize experience with Enterprise JavaBeans (EJB), servlets and business-logic modules. But remember, not all hiring managers consider EJB and J2EE experience a prerequisite.
■ Make your résumé stand out with some knowledge of Unified Modeling Language, the standard notation in object-oriented design methodology.
■ Learn Simple Object Access Protocol (SOAP) and Web Services Description Language (WSDL), which are key Web services underpinnings, to be well positioned for the expected surge of Web services. Another technology to know is XML Schema, or XSD, which is at the core of SOAP, WSDL and Uniform Description, Discovery and Integration.
■ **Bonus tip:** Add server-side Java skills and business experience to deep development skills.

Training

■ IT professionals have myriad Java training options, from tutorials to "code camps" to Sun Microsystems Inc.'s Java University. Certification and education companies such as Learning Tree International Inc. in Los Angeles offer a wide variety of Java programs, as do universities with strong IT programs.
■ There are hundreds of Java certification options. Recruiters say Sun's offerings carry the most weight, but any certification may help; only about 25% of Java developers are certified.
■ **Bonus pay?** Before you spend $300 to $3,000 for training, be advised that some training experts say certifications can help boost your salary 35% or more, but other recruiters say Java certifications mean little to them.

Salaries

■ A few current full-time job postings include Java developer with experience in J2EE, servlets and EJB, $65,000 salary, Nashville, and Java Swing developer to work with database specialists at a large financial institution, $80,000 to $85,000 salary, Chicago.
■ **Hot markets:** New York, with its concentration of financial services firms, is a hot spot for Java developers. Another market to watch is Boston, a biotechnology and biopharmaceuticals hub.

SOURCES: JIM ROBINSON, VICE PRESIDENT OF NEW ENGLAND OPERATIONS AT NEW YORK-BASED RECRUITING FIRM ROBISON SYSTEMS INC.; GLENN SNYDER, VICE PRESIDENT OF ENGINEERING AT NATICK, MASS.-BASED EDOCS INC.; DAVID TRUDEL, AN ANALYST AT CAMBRIDGE, MASS.-BASED FORRESTER RESEARCH INC.

Hot Java!

What you need to know to land a job and keep your skills fresh in the Java development field. By Steve Ulfelder

Employee Spotlight

Name: HERB BERGER
Title: Advanced technology group manager
Employer: Limited Technology Services Inc., the IT arm of retailer The Limited Inc. in Columbus, Ohio
Current IT staff: About 750
Now seeking: The Limited has openings for about a half-dozen Java programmer/analysts and senior programmer/analysts. "Java has become much more mainstream [in] the past two years," Berger says. "It's almost easier to find Java people than C++ people now."
Reason: In the past two years, The Limited has consolidated operations and created Limited Technology Services. "We had to identify core technologies so we could get more reuse, and Java and J2EE [Java 2 Enterprise Edition] certainly qualify," Berger says. The centralized IT organization has a 40-member internal Java user group that makes decisions about how and when to publish objects for reuse, for example.

CAREERS

The Limited has two hot Java projects right now. First, the company is changing e-commerce platforms for its Victoria's Secret Web site, one of the world's busiest e-commerce sites. The site was built using IBM's Net.Commerce platform; The Limited recently evaluated a revamped version of Net.Commerce, as well as BEA Systems Inc.'s suite. (San Jose-based BEA got the nod.) The changeover is keeping many staffers busy.

In addition, the retailer has launched a project known internally as the Integrated Brand Delivery Initiative. This ambitious program, which uses Java underpinnings, combines an upgrade of in-store register systems with new performance and scheduling tools.

– Ulfelder is a freelance writer in Southboro, Mass. Contact him at sulfelder@yahoo.com.

Best Place

- An investment management company that offers mutual funds and other financial products and services to individual and institutional investors.
- Ranked No. 82 on *Computerworld*'s 2002 Best Places to Work in IT list.

2001 revenue: Vanguard is privately held, with more than $580 billion under management in its 106 U.S. funds.

Number of IT workers: 2,700; 700 to 800 are involved in Java programming.

How it hones staff skills: "To recruit and retain great Java engineers, you need competitive compensation," says Jeff Dowds, principal of direct investor systems at Vanguard. "We pay our crew well."

Vanguard also offers (and pays for) comprehensive training – about 20 courses in XML, HTML, JavaScript, Perl and other Java-related technologies.

Dowds says Vanguard's best retention tool is its commitment to advanced technologies. "If you want to attract the best people, you need to be working with the tools that appeal to them," he says. "We exploit browsers and application servers, and we're heavily object-oriented – for anyone in the IT business, that's what they want to work on."

JAVA CERTIFICATION DEBATE

Find out why classroom training in Java development doesn't impress some employers.

QuickLink: 29401
www.computerworld.com

3G Wireless Works!

Faster deployment

Your choice of wireless carrier matters! CDMA carriers are the first to market with fully standardized, commercial 3G networks and devices—long before other wireless carriers. By choosing a CDMA carrier, you can leverage the real and practical advantages of 3G CDMA ***today***, and avoid the pitfalls of a costly and complex wireless network and device migration path.

Faster network throughput

Today's 3G CDMA networks provide peak rates up to 144 kbps. But more importantly, they provide real throughputs of up to 60-90 kbps, enabling many applications that were never before practical over a wireless wide area network (WAN).

More device choices

With our industry-leading chipset and software solutions, QUALCOMM is enabling the rapid development of 3G devices by dozens of leading manufacturers worldwide. This includes PCMCIA cards with WAN access at up to 60-90 kbps for enterprise data applications such as e-mail, customer relationship management and sales force automation. Phones and PDAs with low-latency browsing, color displays, and increased capabilities for position location and enhanced wireless multimedia are also commercially available. *(See www.3Gtoday.com for more details.)*

Faster development

QUALCOMM has created an open applications platform called the Binary Runtime Environment for Wireless™ (BREW™) that supports native C/C++ and Java™ applications, enabling developers to extend enterprise applications quickly and easily. BREW also lets you download and update applications directly to the user's device for better software management and control.

Faster decisions

Our mobility experts at Wireless Knowledge deliver strategic mobility solutions that leverage existing investments while harnessing the technical and competitive advantages provided by today's 3G wireless technologies. By extending critical corporate applications to mobile devices, business professionals are empowered to make informed, financially justified decisions to drive their business.

Faster ROI

From improved productivity and responsiveness to better logistics and customer relationship management, the benefits of corporate data mobility are more compelling now than ever. Visit **www.qualcomm.com/enterprise** to learn more.

QUALCOMM®

wireless knowledge

© 2002 QUALCOMM Incorporated. All rights reserved. Binary Runtime Environment for Wireless and BREW are trademarks of QUALCOMM Incorporated. Java is a trademark of Sun Microsystems, Inc. All other trademarks are property of their respective owners.

Development On the Qt

THE INTRODUCTION of Microsoft Visual Studio .Net drew a lot of attention to issues like whether C# is preferable to Java and how the .Net framework compares with the Java 2 Enterprise Edition framework.

OPINION

My recommendation is to go with Java and J2EE, in part because they're maturing so quickly, but mostly because they don't tie you to Windows as a development platform.

But with all this fuss being made about C# vs. Java and the competing frameworks, it's easy to forget that there are many other options for application development. My favorite is Qt, from Trolltech AS. The latest version of Qt, Version 3.0, is the foundation for the phenomenal K Desktop Environment (KDE). I'm crazy about KDE 3.0, so it should come as no surprise that I'm equally enamored with Qt.

Qt is a set of C++ libraries and visual development tools. It's available for Windows, Mac OS and just about every flavor of Unix — including Linux — and many handheld devices, such as the Sharp Zaurus. The Qt application programming interface (API) is virtually identical for all desktop platforms, so you can create a single source-code base and should be able to compile it without modification for all the supported operating systems.

The latest version of Qt includes support for SQL access to databases via plug-ins that support Open Database Connectivity, Oracle, Sybase, MySQL and PostgreSQL. It has a broad range of XML objects and functions and supports OpenGL 3-D graphics, customizable graphical user interface themes, layout managers to help an application look its best on any platform and more.

Trolltech is also working on a project that will allow you to add a JavaScript-like language for your Qt applications. This will give your Qt-based applications scripting facilities, much like today's productivity applications support various forms of Basic scripts, such as Visual Basic for Applications.

The Qt API has expanded so dramatically during the past couple of years that one might get the impression that it's getting too bloated to be useful. But you can get the source code to Qt, and the configuration step for compiling your own Qt libraries makes it very easy to eliminate the features you don't need, so you can trim Qt down to nearly any size you want.

The handheld support is especially fascinating. Trolltech offers a complete handheld desktop environment called Qtopia. Qtopia includes Java support and comes with dozens of applications, including a full range of personal information management programs like those you get with a Palm device.

All of the aforementioned software is open-source and free, as long as you distribute your applications according to the requirements of the GNU General Public License. (You must also make your source code available.) If you want to sell proprietary applications based on Qt, you have to pay license fees to Trolltech. The license fees seem a little steep at more than $3,000 per developer for the enterprise edition of Qt, but it's well worth it.

Some programmers balk at using Qt because it relies on C++ instead of C. Personally, I suspect that many of them claim the problem is with C++ but that their real reluctance lies in their inability to conceptualize object-oriented programming techniques. That's not to say that C++ is an ideal language. Java was designed to eliminate many of the weaknesses in C++, and it does that job very well. But there's still room for C++ in your arsenal of languages.

The other objection to C++ is that it's slower than C. But let's face it — we gave up some speed when we graduated from assembler to C many years ago. I don't see why we can't give up a bit more speed to gain the advantages of C++ and tools like Qt. Certainly, if you're considering Java or C#, you've already decided that raw speed isn't the determining factor in your choice of language.

Java boasts the best degree of platform neutrality. C# could eventually give Java and C++ with Qt some serious competition, if anyone successfully ports the .Net framework to other platforms. But if you want to use the lean, mean C++ to build applications that will have the widest audience, I don't see how you can beat the combination of C++ and Qt. ◗

NICHOLAS PETRELEY is a computer consultant and author in Hayward, Calif. He can be reached at [redacted].

SNAPSHOTS

Barriers to Web Services

Programmers say that the following are the biggest barriers to developing applications for Web services

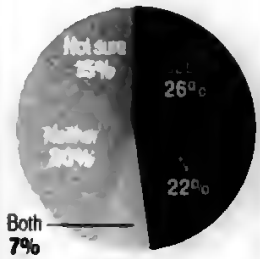
1. Ambiguous or missing standards
2. Lack of end-to-end security
3. Uncertainty about how to build Web services application architectures
4. Establishing trust among e-business partners

BASE: 813 SOFTWARE DEVELOPERS IN NORTH AMERICA

SOURCE: [illegible]

J2EE vs. .Net

Is your company more likely to commit to J2EE or .Net as its Web services foundation?



BASE: 100 CIOs (75 IN THE U.S. 25 IN EUROPE)

[illegible]

Three Phases

Adoption of Web services is expected to follow this timetable

2002-03
Within the firewall
BENEFITS: Simplified application integration, increased developer productivity

2003-05
Controlled set of external users
BENEFITS: Simplified business partner connectivity, richer application functionality, subscription-based services

2005-08
Fully dynamic search and use
BENEFITS: Casual or ad hoc use of services, new business models possible, commoditization of software

[illegible]

NICHOLAS PETRELEY

Development On the Qt

THE INTRODUCTION of Microsoft Visual Studio .Net drew a lot of attention to issues like whether C# is preferable to Java and how the .Net framework compares with the Java 2 Enterprise Edition framework.

OPINION

My recommendation is to go with Java and J2EE, in part because they're maturing so quickly, but mostly because they don't tie you to Windows as a development platform.

But with all this fuss being made about C# vs. Java and the competing frameworks, it's easy to forget that there are many other options for application development. My favorite is Qt, from Trolltech AS. The latest version of Qt, Version 3.0, is the foundation for the phenomenal K Desktop Environment (KDE). I'm crazy about KDE 3.0, so it should come as no surprise that I'm equally enamored with Qt.

Qt is a set of C++ libraries and visual development tools. It's available for Windows, Mac OS and just about every flavor of Unix — including Linux — and many handheld devices, such as the Sharp Zaurus. The Qt application programming interface (API) is virtually identical for all desktop platforms, so you can create a single source-code base and should be able to compile it without modification for all the supported operating systems.

The latest version of Qt includes support for SQL access to databases via plug-ins that support Open Database Connectivity, Oracle, Sybase, MySQL and PostgreSQL. It has a broad range of XML objects and functions and supports OpenGL 3-D graphics, customizable graphical user interface themes, layout managers to help an application look its best on any platform and more.

Trolltech is also working on a project that will allow you to add a JavaScript-like language for your Qt applications. This will give your Qt-based applications scripting facilities, much like today's productivity applications support various forms of Basic scripts, such as Visual Basic for Applications.

The Qt API has expanded so dramatically during the past couple of years that one might get the impression that it's getting too bloated to be useful. But you can get the source code to Qt, and the configuration step for compiling your own Qt libraries makes it very easy to eliminate the features you don't need, so you can trim Qt down to nearly any size you want.

The handheld support is especially fascinating. Trolltech offers a complete handheld desktop environment called Qtopia. Qtopia includes Java support and comes with dozens of applications, including a full range of personal information management programs like those you get with a Palm device.

All of the aforementioned software is open-source and free, as long as you distribute your applications according to the requirements of the GNU General Public License. (You must also make your source code available.) If you want to sell proprietary applications based on Qt, you have to pay license fees to Trolltech. The license fees seem a little steep at more than $3,000 per developer for the enterprise edition of Qt, but it's well worth it.

Some programmers balk at using Qt because it relies on C++ instead of C. Personally, I suspect that many of them claim the problem is with C++ but that their real reluctance lies in their inability to conceptualize object-oriented programming techniques. That's not to say that C++ is an ideal language. Java was designed to eliminate many of the weaknesses in C++, and it does that job very well. But there's still room for C++ in your arsenal of languages.

The other objection to C++ is that it's slower than C. But let's face it — we gave up some speed when we graduated from assembler to C many years ago. I don't see why we can't give up a bit more speed to gain the advantages of C++ and tools like Qt. Certainly, if you're considering Java or C#, you've already decided that raw speed isn't the determining factor in your choice of language.

Java boasts the best degree of platform neutrality. C# could eventually give Java and C++ with Qt some serious competition, if anyone successfully ports the .Net framework to other platforms. But if you want to use the lean, mean C++ to build applications that will have the widest audience, I don't see how you can beat the combination of C++ and Qt. ◗

SNAPSHOTS

Barriers to Web Services

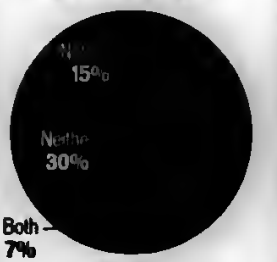
Programmers say that the following are the biggest barriers to developing applications for Web services:

BASE: 813 SOFTWARE DEVELOPERS IN NORTH AMERICA

SOURCE: EVANS DATA CORP, SANTA CRUZ, CALIF., MARCH 2002

J2EE vs. .Net

Is your company more likely to commit to J2EE or .Net as its Web services foundation?



BASE: 100 CIOs (75 IN THE U.S., 25 IN EUROPE)

SOURCE: MERRILL LYNCH & CO., NEW YORK, MARCH 2002

Three Phases

Adoption of Web services is expected to follow this timetable:

2002-03
Within the firewall
BENEFITS: Simplified application integration; increased developer productivity

2003-05
Controlled set of external users
BENEFITS: Simplified business partner connectivity; richer application functionality; subscription-based services

2005-08
Fully dynamic search and use
BENEFITS: Casual or ad hoc use of services; new business models possible; commoditization of software

SOURCE: IDC, FRAMINGHAM, MASS., FEBRUARY 2002

PRODUCED BY
COMPUTERWORLD
CUSTOM PUBLISHING

STORAGE
NETWORKING
WORLD
ONLINE

ENDORSED BY
SNIA

www.snwonline.com/300

Senior Software Engineer
Ft. Collins, CO

Requires in-depth knowledge of internet- based messaging protocols, Java Messaging Specification and Java / C-based embedded systems. Also requires hands-on experience with commercial JMS-based products, J2EE, Solaris and Linux environments and development of software to control electrical power equipment. Must have MS Computer Science or equivalent education and experience. Travel required.

NO THIRD PARTY RECRUITERS. No relocation available. **Qualified candidates may submit resumes to: SE402@6D.com** EOE

Software Engineers- Research, design, test, and implement software systems in a client/server and IBM mainframe environment for clients: analyze requirements, evaluate applications, formulate design approach, develop software, and fix technical problems. Use IBM ES 9000, MVS/ESA, VSAM, DB2, CICS, JCL, Cobol, QMF, Xpediter, ENDEVOR, Visual Basic, Access, HTML, Oracle, APS, REXX, SPUFI, and LAN based DOS Fospro, Regs Master of equivalent foreign degree in Computer Science, Computer Engineering, or System Management and 1-year experience in the related occupation as a Programmer Analyst or Mainframe Consultant. Must have 1-year experience in design of software system in a client/server and IBM mainframe environment, and use of APS, Endevor, MVS/ESA, QMF, and SPUFI. $71,302.50/yr, 40 hrs/wk, 8a-5p, M-F Work location: Various unanticipated locations throughout the U.S. Send resume to Colorado Department of Labor and Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Ste. 400, 1515 Arapahoe Street, Denver, CO 80202-2117, and refer to order CO5019207. An employer paid ad. Application to by resume only. Must have proof of legal authority to work in the US.

Dublin Manufacturing Co. seeking F/T exptl. Manager of Product Support to research, design, and developing of computer software systems, in conjunction with hardware product development. Analyze software requirements to determine feasibility of design within time and cost constraints. Consult with hardware engineers and other engineering staff to evaluate interface between hardware and software, and operational and performance requirements of overall system. Formulate and design software system, using scientific analysis and mathematical models to predict and measure outcome and consequences of design. Bachelor's degree in Computer Science, competitive salary. Fax resume to Alison (581) 995-8027.

Software Devel, Denver Use working knowledge of IBM AS/400, Windows NT, UNIX platforms to generate error free applic & system codes to meet client specs. Document logic in software programs maintain/enhance product module functionality & document changes, conduct unit/integration testing for functionality & limits, tech assist to program users, participate in design process & reviews, stay updated on tech reports re program developments. Min req. BA or for equiv/Engrl math, physics, comp sci. + 1 yr as Syst. Analyst, Programmer Software Consultant or supervisory position in same. $52,080/yr, 40 hr/wk. Must have proof of legal authority to work in the U.S. Apply by resume only to Colorado Department of Labor & Employment, Employment Programs, Attn. Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe St., Denver CO 80202-2117. Refer to Job Order #CO5019169

Programmers, Jr. Programmers, Software Engineers
Design, develop, test and implement specialized software apps using data encryption technology including Amtrix, Crossworlds, Oracle RDBMS, Oracle tools and 3rd party utilities including Toad, SQL Navigator, Oracle Forms and Reports. US Workers only. Consulting positions requiring travel. Prevailing wage/benefits. Send resume to HR, Deccan-Tech Corporation, 4284 Vendgris Circle, San Jose, CA 95134.

Systems Programmers/Analysts in Houston, TX needed to plan, develop, test programs using code and application profiling, load and stress testing, risk and reliability evaluation. Must have Bachelor's degree and 2 years experience in job offered. Resumes should be emailed to Systech Business Solutions at systech@systechbusiness.com. Put code ADVP3 on email.

Software Engineers
Design, develop, test and implement software using Java, J2EE, Weblogic/Websphere, Distributed Technologies, Rational Rose, UML, Oracle, and SQL Server on Windows NT/2000, UNIX. Prevailing wage/benefits. Send resume to HR, Radiumsoft, 4470 Chamblee Dunwoody Rd., Suite 200, Atlanta, GA 30338. EOE.

Systems Analyst. Design/develop business intelligence systems. Test applications & develop Oracle based reports using discoverer. Req: Bachelors in Engineering & 2 yrs. experience. 40-hr/wk. Job/interview site Springfield, VA. Send resume to Minds Technologies, Inc. P.O. Box 1342, Springfield, VA 22151

Interface Analyst needed to assist in the planning, coordination, testing and successful implementation of systems interfaces for an Application Service Provider. Gather functional requirements from clients and document requirements for subsequent releases of company's Software. Provide responsive and timely feedback and support to client facing teams (Sales, Client Services and Customer Care). Ideal candidate must have BS in Computer or related field and at least 1 year of related experience. Must have working knowledge of MS SQL, Visual Basic, ASP, JSP, ERWin4.5 and BPWin4.0 , as well as Rational's suite of products including Rational Rose 2000e, and Rational RequisitePro. This is a full time position, from 9a.m. to 5p.m. Please fax or send resume to Shan Gerencher at (312) 456-0839, Visibility, Inc. 68 E. Wacker Pl., Chicago, IL 60601

System Engineer - OPNET Modeling - MeshNetworks, Inc. seeks candidate with 3 - 5 years experience in communication networks R&D and modeling communications networks with the OPNET tool. Knowledge of entire OPNET model development process and network performance analyses required. Strong research background in QoS algorithm design in distributed networks and experience in modifying radio pipeline stages in physical layer protocol modeling required. Design and modeling experience with link layer protocols including 802.11 and CSMA/CA required. Experience with the OPNET IP routing modules, ad-hoc network protocols and resource reservation protocols. Software skills should include C/C++, Proto-C, UNIX, Windows and RTOS. MS degree required, PhD preferred. Send resume to: HR, MeshNetworks, Inc., P.O. Box 946133, Maitland, Florida 32751

Applications Programmer II Dvlp s/ware apps for back and credit card services; code prgm modifications; dvlp models & simulations based on credit card back and processing data structure & fin'l analysis. Bach in MIS, Finance, Economics, or Acctg + 2 yrs exp, incl exp in: VB prgmg, fin'l analysis, credit card back and processing data structure analysis, SQL server. Send resumes to Thomas Lloyd, Wells Fargo Merchant Services, 7000 Vista Dr., W. Des Moines IA 50266.

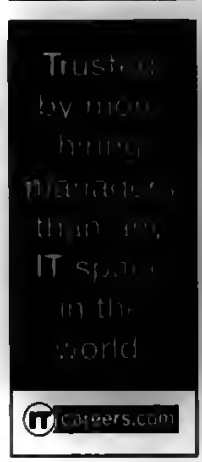
SYSTEMS ANALYST to provide on-site consulting in analysis, design and development of business applications for manufacturing, distribution and retail industries using CASE tools on IBM AS/400; provide customization and implementation of shop floor tracking systems (MESA), warehousing systems (PKMS) using RPG, RPGLE, COBOL, C and SQL, and with technology tools Java, JDBC, Active Server Pages, JavaScript and VBScript. Require: B.S. in Computer Science and two years experience in the described job duties. 40% travel to client sites within the United States required. Competitive salary and benefits; 40 hrs/wk, 8 am to 5 pm, M-F. Mail resume to: Vice President, Frontline Consulting Services, Inc. 9701 Mallard Creek Road, Charlotte, NC 28262.

Physical Therapy office is looking for Oracle/Microsoft Certified Professional Database Administrator to setup local area network, design and develop databases, optimize database performance, design and implement backup and recovery strategies, perform system upgrades, install and maintain medical records and patient accounting applications, and perform system administration. B.S. Computer Science req. + 2 yrs exp with medical applications. $55,000.00 per year. Qualified applicants only. Send resume to Mrs. M. Baguio, 1037 NW 10th Lane, RR1 Box 54, Ava, MO 65608. EOE.

Sr. Programmer/Analyst to develop applications for Energy, Banking, Healthcare & other sectors. Should have experience in PowerBuilder 7.0, PeopleSoft 7.5, Oracle & 1, Sybase XI, Informix 7.0, TOAD, Erwin, Power Designer, Visio & should be able to integrate Client Server applications with Palm Pilot. Experience in with applications using ASP.NET, HTML & Web. PB. Applicant should have BS in Computer Science or Engg. + 5 yr. exp. + Certified PowerBuilder Developer. Salary at prev. wage rate. Apply to SkyBridge Inc., 2100 Roswell Road, Suite 200C-900, Marietta, GA 30062 with work auth. proof in US.

Several computer related positions for large telecommunications consulting services company. Send resume to Tangela Burks, SchlumbergerSema, 30000 Mill Creek Avenue, Suite 100, Alpharetta, GA 30022.

Systems Analysts, Bethesda, MD. Develop CGI client/server softwares for biomedical applications, incl sequence comparison & alignment algorithms, biological database development, contig assembly algorithms, protein & DNA/RNA sequence analysis methods & algorithms using C/C++, PERL, SQL, HTML & Oracle or Sybase databases, relational databases, shell script languages for OS Windows NT & UNIX. Reqd: B.S.C.S. or rel field & 2 yrs rel exp. M-F, 40hrs/wk. Send resume to I. Sytnikov, HR, REF # 402, InforMax, Inc., 7600 Wisconsin Avenue, 11th Floor, Bethesda, MD 20814.



Database Production Analyst
Individual must assist the Database Solutions team in the fulfillment of client requests for direct marketing information generated by various CPPM data files/databases. This includes participation in database design and implementation, and the utilization of appropriate software and methodology to streamline data processing.

Minimum requirements: Bachelor's degree in computer science, information systems, or related analytic field (marketing), plus three years previous experience. Three years previous experience must include database marketing, data file processing, data QC/analysis, and UNIX.

Competitive salary. Hours: 8 am - 5 pm, M-F. Must have indefinite right to work in U.S. Send resume demonstrating minimum requirements to:

ChoicePoint Precision Marketing
8 Riverside Drive, STE. 203
Andover, MA 01810
Attn: James Noonan

COMPUTER/IT
IBM NMS Consulting Sales Eng'r. Framingham, MA. Identify new and existing opportunities for NMS, which requires knowledge of the engineering of complex IBM networking environments and how they can be architected and managed cost effectively. Will assist sales staff and ensure effective solutions and will provide technical training to IT staff on use of GSOA customer service portal post-implementation. **REQUIRES:** 8 yrs. exp. in job offered or 5 yrs. exp. as a Sr. Ntwrk Consultant/Systems Eng'r. Exp. which may have been obtained concurrently, must include 8 yrs exp. with WAN, VPN, and LAN technologies & NT, UNIX and Netware operating systems. Must possess experience in IBM AS400, TN3270 protocols, devices and associated front-end processors, IBM NetSys Management System, and HP OpenView and/or Cabletron Spectrum. Must be CIP Certified. Mail resumes w/ ad (no calls). D. Schofield, DiData, 135 Newbury St., Framingham, MA 01701

Senior Software Engineer. Develop a framework for Bluetooth/WAP enabled web applications. The framework provides basic building blocks such as Catalog Builder, User Management, Time/Location/User based content, automatic generation of UI specific to the type of device. The framework is based on open standards such as XML, WAP and Bluetooth and is built on java based technologies. Requires B.S. in Electronics and Communications and 5 years experience in Software development. 40hrs/wk (9:00 A.M. to 5:00 P.M.), $75,000.00/yr. Send two resumes/responses to: Job Order Number 2001-910, P.O. Box 989, Concord, NH 03302-0989

Programmer/Analyst (Alpharetta, GA). Design and develop software applications using COBOL, DB2, CICS, JCL, VSAM, SQL, (J2EE) APIs like JDBC, Servlets, JSP, RMI, EJB. Req. Bachelor or its foreign degree equivalent in C Sc., Engineering, or its related field plus 2 yrs. exp. in job described. Resume to: HR Manager, job code GC0586, Software Services & Resources, Inc., 3574 Old Milton Pkwy, Alpharetta, GA 30005

Carnival Cruise Lines seeks:
Programmer/Analyst - Design, implement/support appl. systems on Unisys 2200 in a Microsoft (MS) NT network.
Database Administrator - Install & configure SQL database servers in MS Windows NT/2000.
Systems Support Specialist - Analyze/configure/support server & desktop systems in MS Windows NT.
Computer Systems Analyst & Sr. CSA - Analyze/code/test/implement tech. solutions for software appl. & systems using MS tech. Coordinate systems/database & telecomm. development.
Applications Analyst & Sr. AA - Resp. for wireless solutions, state-of-the-art products/develop appl. in MS NT environment.
Datawarehouse Specialist - Resp. for data modeling/Oracle databases on a Sun Solaris UNIX platform/build appl. & database components w/POWERMART tool & BRIO Query.
Require: B.S. or Equiv. in Computer Sc., Engineering or Math & relevant exp. OR substantial relevant exp. Resumes to: Beatriz Rodriguez/Recruiting Mgr/3655 NW 87 Av, Miami, FL 33178.

Database Design Analyst-RTP, NC-Provide system requirements analysis & system database design & development in a team setting. Develop project requirements using formerly applied methodologies. Implement & support database software applications used for Data Quality Assurance analysis. Provide on-site consulting to clients, analysts, programmers & operations staff to ensure that Data Warehouse data quality meets system requirements & user needs. Conduct data retrieval to automate manual tasks performed for data quality metrics. A Bachelor's degree in Electrical Engineering, or Computer Science & 4 years experience as Database Design Analyst or Programmer are required. Experience must include 4 years developing database applications. Please send resume to Ref (#214)- The Underwood Group, 5001 Weston Parkway, Suite 105, Cary, NC 27513, or email to Tug@underwoodgroup.com

Mrs. Smith's Bakeries, LLC, in Suwanee, GA needs an EC Developer to develop, maintain, and support e-commerce software programs; design/develop interfaces w/ various systems using, ABAP/4,SAP/EDI, IDOCs, SAP/Workflow, and Business Connector. Perform specialized functions using SAP/ALE, SAP ABAP programming skills, UNIX, SAP, Gentran, ITS Programming, Java, and Web Reporting. Req. Bachelor's degree in electronics communication engineering, computer science or related field plus 2 yrs of exp in the job offered OR 2 yrs exp in the area of information systems and technology focusing on SAP Integration, EC initiatives, Interface/migration design, development and mapping. Resumes to: D. Queen, Mrs. Smith's Bakeries, LLC, 2855 Rolling Pin Lane, Suwanee, GA 30024.

Software Eng'rs: Research, design, dvlop & implement web-based an applics'n w/ C/C++, Java (EJB, JSP, Applets, Servlet, JDBC), VB, VBScript, Weblogic, ASP, SQLServer2000, 7.0, ADO, DHTML, HTML. Dsgn DB/ frontend for applic'n w/ SQL, Oracle8.x, & convert DB from DB2/Oracle into SQLServer-based w/ AS400/Cobol. 40hr/w, 8-5, BS in eng'g/foreign equiv'l, & 2 yr wk exp. in job/in any position invol'g AS400, Oracle/ Weblogic, Unix. Resume to Sys Soft Tech of Clearwater, FL at admin@sstech.org/fax: 727-723-8801

INFORMATION TECHNOLOGY . . . . OPPORTUNITIES

The Gillette Company is the world leader in more than a dozen consumer product categories. Global World Class operations are increasingly dependent on Information Technology. Exciting opportunities exist in global business process integration initiatives. We are currently seeking the following highly qualified professionals to join the Gillette IT team in the Boston area.

The following positions commonly require a Bachelor's degree (or equivalent) in Computer Science, MIS, Business Admin., or similarly relevant field, and 3-5 years relevant experience.

/ Staff Programmer Analysts

/ (SAP) Staff Basis Administrators/Con-figuration-Integration Specialists/ Application Developers

/ Data Warehouse Architects/ Developers/Database Administrators

/ Telecommunications Analysts

Starting salaries range from $56,100 to $118,000 per year, together with paid vacation, medical, dental, life and disability insurances, and other industry-competitive benefits.

Please email resume to www.Gillette.Com

The Gillette Company is an equal employment opportunity employer

F/T Project Implementation Specialist. Responsible for working with the customer to analyze and document data processing requirements and implement data programming for processing those requirements. Configures and installs applications using C/C++, COBOL, UNIX and Windows. Work background must have included exp. with the US telephone billing/mediation industry. Must have a Bachelor's degree in Computer Engineering or foreign degree equivalent. Must have two year exp. Salary: Competitive. Send resume to J. Laudenschlager, Intec Telecom Systems, 5775 Peachtree Dunwoody Rd., Bldg. G, 3rd Fl., Atlanta, GA 30342.

Programmers, Jr. Programmers, Software Engineers
Design, develop, test and implement specialized software apps using Novera. Web Integrator, IFD, MMD, TTM, PM, SCADA, CD Requester, java, C, C++, VB, EDI, ANSI X12, DNP3.0 Modbus and Marcator, SPARC HA, RIM, C:D and Apache Web Servers. US Workers only. Consulting positions requiring travel. Prevailing wage/benefits. Send resume to HR, G.R. Patel & Associates, Inc. P.O. Box 1008, Waldorf MD 20604.

Systems Analyst-Chamblee GA. Analyze, design, develop, test web, client server mainframe & ERP Solutions with C, C++, Java, Oracle, VB, Win Runner, Load Runner, SOA Robot, Silk, Silk Performer and Dbase 3-on Unix/Windows. BS or Comp. Sc./Rel. field and 2 yrs. exp. in job offered. $62,920/Yr & benefits. Please respond to North Metro Job Order #GA 7082119, 2943 N. Druid Hills Rd., Atlanta, GA 30329 or the nearest Department of Labor Field Service Office. EOE

Software Engineer to analyze, design, develop, test and implement Internet Billing System and mission critical development projects using: C, Oracle, Visual Basic, SQL Server etc; maintain and support client/server, internet/intranet apps using Java, HTML, JavaScript, JSP and Java Servlets; perform requirements analysis, problem analysis, solution design, implementation and documentation on developed applications; perform debugging and modifications on existing software. Require: M.S. or foreign equiv in CS/Engineering (any branch) or related field with 1-year exp. in the job offered. Competitive salary. Travel required. Resumes to, intercall Inc, Attn Bala – Director, 1718 Peachtree Street, NW, STE 554, Atlanta, GA 30309

NET2S
NET2S is a leading International Consulting and Engineering firm specializing in communications technologies. We are presently seeking to fill the following positions.

- Sr. SAN/Unix Engineer
- TIBCO Engineer
- Sr. Security Systems Engineer
- Sr. Tibco/MQSeries Developer

All positions require BS/MS degree with a minimum of 2 to 3 years of experience in the field. Must possess excellent communication skills as well.

NET2S, 82 Wall Street Suite 400, New York, NY 10005; Fax: (212) 279- 1960; Phone (212) 279-6966; or Email: jobus-ny@net2s.com

IT Technical Analyst 2, Charlotte, NC. First Union/Wachovia Corp. Dvlp & maintain utility software to manage UNIX & eCommerce server. Requ. BA in Comp. Science or Info Tech & 1 yr exp. The 1 yr must have incl. work developing internet appl. & interface dvlp. using Java, in an Oracle Database & UNIX Envir. & work w/ TCP/IP networking, HTML, DHTML, CSS, Java Script, JDBC, JSP, Java Servlets, SQL, OOA, OOD and OOP. 40hrs/wk, $41-$69. Send resume and cvr. ltr. to Amy Kee, 1525 West W.T. Harris Blvd., NC 0775, Charlotte, NC 28288-0775.

Manager, Software Engrng wanted by legal info services co in NYC. Plan/manage the design & dvlpmt of high-and web applics in client-server environmt. Knowledge of COAD, COM/COM+/DNA, MSCS, MSMQ, UML, Microsoft.Net, SharePoint, SQL Server, Oracle, VB, ASP, software metrics. Resumes to: CCH Legal Information Services, 111 8th Ave, NY, NY 10011.

Programmer/Analyst (Alpharetta, GA). Design & develop healthcare software applications using Rational Rose, RUP, Requisite Pro, Clear Quest, Clear Case, Oracle, Websphere, IBM MQ Series, SQL, Cyber+Le & (J2EE) APIs like JDBC, Servlets, JSP, RMI. EJB. Req. Bachelor or its foreign degree equivalent in C Sc., Engineering, or its related field plus 2 yrs. exp. in job described. Resume to: HR Manager, job code GC0587, Software Services & Resources, Inc., 3574 Old Milton Pkwy, Alpharetta, GA 30005

Software Engineer who will develop, create and modify computer software using working knowledge of J2EE Technologies, Websphere, Weblogic, Enterprise Java Beans, Visual Cafe, Rational Rose, CICS, DB2 and COBOL. Will implement Content Management Applications using working knowledge of Vignette V6 and CRM using Epiphany. Applicant must have at least two years work experience developing, creating and modifying computer software. Applicant must have working knowledge of object oriented analysis, design using XML, EDI data migration, Mainframe and JDK tools. Applicant must have a Master's degree in engineering or computer science. Work involves extensive travel and frequent relocation. $65,000/year 40 hours/week, 9:00am-5:00pm. Send resume, listing Job Order Number WEB 241752, to Fayette County Team PA CareerLink, ATTN: JS Supervisor, 32 Iowa Street, Uniontown, PA 15401-3813.

Financial Systems Analyst: A US residential A commercial roofing manufacturer is seeking a Financial Systems Analyst who will be responsible for administering & maintaining TM1 OLAP systems, developing web based financial/sales/freight management reporting & providing technical support for TM1 users. Req'd: Bachelor's degree in Finance, Business, Computer or related w/2 yrs exp in the job offered or as Business Operation Systems Analyst. Must have exp w/financial planning and/or reporting processes and/or systems. Must have exp. w/OLAP technology, spreadsheet, RDBMS & web environments. Send res. or Kathryn Schoenbaechler, GAF Materials Corp., 1361 Alps Rd., Wayne, NJ 07470.

Oracle Financials Programmer Analyst II (Kannapolis, NC). Develop new codes and analyze and maintain existing custom codes for the Oracle ERP applications. Apply analytical and technical skills to define and resolve technical problems and issues. Write codes, test, implement, support and maintain applications enhancements. Maintain existing codes and functionality. Create and amend Oracle tables, and create and change dependent triggers and store procedures. Provide technical support for projects. Assess requirements and translate them into codes. Provide technical expertise and consultation to users and other team members. Candidates must have a Bachelor's Degree or equivalent in Electronic Engineering, Computer Science, MIS, Engineering, or related field & 5 yrs. of relevant progressive professional experience in the above stated areas. Please forward resume to: Mr. Don Melo, VP Human Resources, Pillowtex Corporation, One Lake Circle Dr. Kannapolis, NC 28081

UNIX Internals Developer. Mesh Networks, Inc. an Orlando based firm seeks a candidate to provide system software support in a Unix/Linux environment. Responsibilities include writing device drivers, daemons, and Unix system software or interface our wireless network to our wired network. BS in computer science or electrical engineering and 2 - 5 years experience with Unix internals (Linux preferred), embedded systems and protocol development required. Knowledge of Mesh and Mobile IP is a plus. Experience developing for the SA1100 and the Ipaq highly desired. Candidate must be able to work independently and anticipate requirements. Send resume with salary requirements to: Catherine Spencer, MeshNetworks, Inc., PO Box 948133, Maitland, Florida 32751

HCL

HCL TECHNOLOGIES AMERICA INC

HCL Technologies America, Inc. and its affiliate companies like HCL Enterprise Solutions have multiple openings at its offices in Sunnyvale, CA; Stamford CT, Plano TX, Florham NJ , Irvine CA, Vienna, VA, Boston, MA, Chicago, IL Detroit, MI as well as project sites throughout the United States for the following positions:

Software Engineers
Programmer Analysts
Systems Analysts
Database Administrators
Hardware Engineers
Budget Analysts
Systems/Network Administrators
Project Managers
Account Managers/Sales Managers/Business Managers
Sales Engineers
Industrial Engineers
Market Research Analysts
Management Analysts
Human Resource Representative
Accountants

Salary will be commensurate with education and experience. All positions may involve travel or relocating to various client sites through out the US.

For consideration please send your resume to:

HCL America Technologies Inc
Attn.: HR Dept. (Computer World Ad)
330 Potrero Avenue
Sunnyvale, CA 94085
Email: cwjobs@hcltech.com

Please indicate the location and the position you are applying for.

www.hcltechnologies.com

ANALYST/PROJECT PROGRAMMER: Provide design, development, implementation & maintenance support for World-Wide-Web (WWW) database applications for biological & medical scientific research. Involves: WEB content development, database design & implementation, CGI & JAVA application design & implementation & application interfacing with databases (ORACLE); work with Director & project scientists to create WWW applications to conduct data collection, validation & analysis or directly support & conduct the research project; development of projects in both UNIX (SUN Solaris) & PC (Win 95 & NT) systems. Uses Perl, Java, CGI & relational database design & implementation (ORACLE) to perform duties. Must have Masters degree in Mathematics, Computer Science or biological sciences, completed one course each in Programming Languages, Operating Systems, & Databases as part of overall degree work, & 3 months experience teaching or using mathematical modeling & computer programming; 40 hrs/wk; Multiple positions available. Apply to: Medical College of Wisconsin, Employment Office, 8701 Watertown Plank Rd, Milwaukee WI 53226.

“Next Generation Professionals are hiring all levels of Oracle Application DBAs and other IT Professionals. Senior Level Oracle Application DBAs require Masters/equiv and 3 yrs of exp or Bach/equiv and 5 yrs exp. Send resumes to 10 Vantis, Irvine, CA 92602. May be assigned to client sites nationwide.

PRG Systems, Inc is a worldwide computer-consulting firm providing IT Services for domestic and international clients. Currently we are recruiting multiple positions nationwide:

Oracle DBA Performance Tuning; Disaster recovery Training and mentoring, Process flows, Must have experience in upgrading the Oracle Application from 10.x to 11.x version with Siebel interface - CrossWorlds, Application Cloning, Security Management, Veritas Cluster Server, UTF8 character set conversion, experience with the following Oracle Application modules: Oracle CRM, HR, GL, AR/AP, DBA Studio on AIX, Oracle 7/8/9i Developer 2000.

Oracle 7.x/8.x/9.x, Oracle Applications 10.x/11.x, CrossWorlds, Forms 6i/5.x/4.x, Reports 6i/5.x/4.x, AIX 4.3.3/5i, HP-UX 10.x, Linux, Windows 98/NT/2000/XP, Apache with servers, Parallel and application servers, MCP and OCP certifications is a must.

Salary from $65,000.

Programmer Analysts: Client/Server - Visual, Borland C++, UNIX/C++ Development, Corba, Pro*C, Oracle Developer. Architects with Web and/or Network Management System Engineer with Web experience. Salary from $60,000.

ERP/BaaN: BaaN IV, Business Objects interfaces (BOI), XML, DEM, EDI, B2B, BaaN Tools, XDI, BaaN Finance, Procurement, Oracle, Triton Base, Sun Solaris, NT. Salary from $60,000.

Requirements: Bachelors degree with a minimum of 2 years exp. Some positions require a Masters degree with at least two years of exp. Only those eligible for permanent positions need apply. Must be willing to travel and relocate, if necessary. Salary will depend upon experience.

Please send your resume to PRG SYSTEMS INC 42-C, Read's Way, New Castle, DE 19720, or by email at recruiter@prgsi.com.

Positions are available for a Vice President, Professional Services and a Consulting Manager with an Atlanta-based e-business technology company. The company provides solutions that enable corporations and software providers to leverage emerging technologies to more effectively compete in the global market. The Vice President is ultimately responsible for all global implementation projects and providing professional software expertise to the company's customers. Specific responsibilities include developing goals and strategies to ensure customers continue to receive on-going technical implementation expertise and support; developing strategies to expand the consulting practices and profit loss; and budgeting for professional services organizations.

The Consulting Manager is responsible for managing and implementing multiple global client projects, relationships, and initiatives including managing cross functional teams in evaluating and assessing scope, schedule targets, priorities, risks and conflict negotiation to ensure successful implementation.

Candidates for the Vice President's position should possess a Master's degree in a Computer field and at least five years management experience including two years international IT project management experience with Oracle, AS400 (RDG/400) mainframe, PL/1 and JAVA. Candidates for the Consulting Manager's position should possess a Bachelor's degree in Business or Computer Science and at least five years experience in Technical Consulting including at least two years experience in technical training, third generation programming, project planning and management and implementing technical solutions in middleware.

Apply by mail with resume to:
Cindy Mayer
400 Perimeter Center Terrace
Suite 195
Atlanta, Georgia 30346

Staff Engineer (Essex Junction, Vermont) Veritas RTL modification, verification and implementation of Hard Disk Drive controller ASICs; logic design and verification; setup of simulation environment and platform for batch mode verification; architect and design disk drive controllers for computer applications, utilizing Veritas Hardware Description Language (HDL), Unix C-Shell programming language and AWK. Requires a Bachelor's or foreign equivalent degree in Engineering, computer Science, or MIS and one yr experience in the job offered or one yr experience in the related occupation of Design Engineer 40 hrs/wk, 8:00 am - 5:00 pm, $81,270/yr. SEND RESUMES TO: Job Order No. 613515, Jobs and Training Division, VT Department of Employment and Training, P.O. Box 488, Montpelier, VT 05601-0488.

Software Engineer Duties: Plan, develop & implement the use of testing measurements for software releases using Java. Execute test case sentences & test data for software fixes & enhancements using Java. Maintain test cases & expected results to be used for ongoing regression testing of system. Document test results & comm w/developers on recommended enhancements. Requires B.S. (or foreign equiv.) in Comp. or Info. Sci., Eng. or related field & 2 yrs. exp. in the job offered or 2 yrs. exp. as a Prog./Analyst or Systems Analyst. Concurrent exp. must incl. 2 yrs. developing & implementing the use of testing measurements for software releases and 2 yrs. exp. using Java. EOE. 40 hrs./wk., 8:00 a.m. to 5:00 p.m. Send resume (no calls) to Bonnie Lateve, CTG, Inc., 55 Public Sq., 5th Fl., Cleveland, OH 44113.

Computer

As a $180 million industry leader we are able to provide our people with the kind of work environment, opportunities, benefits, growth potential and progressive training others can't match. We are looking for IT professionals with a minimum of 1+ years experience for the following job titles:

- PROGRAMMER/ANALYST
- SYSTEMS ANALYST
- SYSTEMS PROGRAMMER
- DATABASE ADMINISTRATOR
- DATABASE ANALYST
- LAN ADMINISTRATOR
- SOFTWARE ENGINEER
- WEB DEVELOPER/ARCHITECT
- IT PROJECT MANAGER
- BUSINESS ANALYST
- SAP FUNCTIONAL AND TECHNICAL EXPERTS
- HIGH LEVEL SOLUTIONS SALES EXECUTIVES
- QA/TESTER
- TECHNICAL RECRUITER

Our skills sets include:
- CLIENT/SERVER
- ERP: SAP, ORACLE, PEOPLE SOFT
- INTERNET
- E-COMMERCE
- MAINFRAME
- MID-RANGE: AS/400
- CRM: SIEBEL
- DATA MODELING

Contact the Corporate Headquarters for positions available in the following areas: Arizona, Colorado, Connecticut, Florida, Georgia, Illinois, Massachusetts, New Jersey, New York, North Carolina, Pennsylvania, Southern California, Texas, Virginia/DC.

For consideration please reference Job Code: RIRCW09 and send your resume to: RCG Information Technology, Attn: National Recruiting, 379 Thornall Street, Edison, NJ 08837, FAX: (732) 744-3583 or email to: recruit@rcgit.com. We are an Equal Opportunity Employer M/F/D/V.

www.rcgit.com

RCG Information Technology

Sr. Consultant - i2 Div. Duties: Design, develop & implement decision support supply chain mgmt. appls. using i2's Tradematrix suite of appls. Oracle's APS (Advance Planning & Scheduling) suite of products. Resp. for advance planning opers. Resp. for the develop. of opers. planning modules, the general of detailed demand & opers. planning & the develop. of statistical forecasting modes. Requires M.S. (or foreign equiv.) in Comp. Sci., Eng., Opers. Research or related field & 2 yrs. exp. in the job offered or 2 yrs. exp. as a Consultant or Software Eng. Concurrent exp. must incl. 2 yrs. exp. developing & implementing supply chain mgmt. appls. using i2 appls. & 2 yrs. exp. developing opers. planning modules. EOE. 40 hrs./wk., 8:00 a.m. to 5:00 p.m. Send resume (no calls) to: Diane Tuccito, AnswerThink, Inc., 817 W. Peachtree St., Suite 800, Atlanta, GA 30308.

PeopleSoft Sr. Consultant Job location: Chicago, IL. Duties: Analyze, design, develop & implement software solutions for PeopleSoft Human Resources Mgmt. Systems (HRMS) using SQR, PeopleSoft & SQL. Perform appl. design, set-up & testing using PeopleSoft & Oracle database. Perform Fit & Gap analysis of business processes. Requires B.S. in Comp. Sci., Eng., HR Mgmt. or related field & 3 yrs. exp. in the job offered or 3 yrs. exp. as a Consultant or Software Eng. Will accept any comb. of educ. & exp. equiv. to a B.S. degree. Concurrent exp. must incl. 3 yrs. exp. designing & implementing software solutions for PeopleSoft HRMS & 3 yrs. exp. performing fit & gap analyses. EOE. 40 hrs./wk., 8:00 a.m. to 5:00 p.m. Send resume (no calls) to Diane Tuccito, AnswerThink, Inc., 817 W. Peachtree St., Ste. 800, Atlanta, GA 30308.

Group Leader, Bioinformatics

GENAISSANCE PHARMACEUTICALS, INC. has an immediate opening in its New Haven, Connecticut office for the position of Group Leader, Bioinformatics.

Responsible for leading and performing various research design, coding and testing assignments in the development of computer systems and the managing of human and hardware resources. Performs gene and sequence analysis process and analyzes software requirements from the scientific users to determine feasibility of design within time and cost constraints.

Must possess a Ph.D. in Computer Science or a related field and relevant experience with the genomics industry including the gene and sequence analysis process and tools and their development; object-oriented programming in Java and Relational Database Management Systems in an Oracle Relational Database engine; mathematical concepts such as probability, statistical inference, algorithm proofs, fractions, percentages, ratios and proportions, statistics and probability theory and machine learning techniques.

Resume and/or cover letter must reflect each requirement above and specify reference code GLB or it will be rejected.

Forward resume to Jennifer Baretta, Human Resources Manager, Genaissance Pharmaceuticals, Inc. at 5 Science Park, New Haven, CT 06511. EOE.

SENIOR SOFTWARE ENGINEER to design, develop, test and implement computer software for network management system applications using C, C++, Java, HTML, XML and CORBA operating on Windows 95/98/NT and UNIX platforms over complex advanced intelligent telecommunication networks including Broadband, ATM and ADSL. Mentor junior engineers. Require M.S. degree in Computer Science, an Engineering discipline or a closely related field with two years of experience in the job offered. Extensive travel on assignment to various client sites within the U.S. is required. Competitive salary offered. Apply by resume to: Mac McCracken, MSI Consulting, 8151 Powers Ferry Road, Suite 540, Atlanta, GA 30339. Attn: Job GL.

DataProbe Int'l has rewarding opportunities for career minded professionals. Database Design Analysts experienced in EDI processes with either Oracle or SAP Systems Integration, and Financial Analysts experienced in mergers, acquisitions, statistical & internal control analysis. Excellent benefits and competitive salary. Resume to 8445 Freeport Pkwy, Ste 500, Irving, TX 75063.

PROGRAMMER/ANALYST to analyze, design, develop, test and maintain application software for the telecommunication industry using object oriented techniques, C++, CORBA, HTML, Oracle, GCC, GBD, GUIBC Bonobo and GTK under HP-UX and Linux operating systems. Require B.S. degree in Computer Science/Engineering, or a closely related field with two years of experience in the job offered. Extensive travel on assignment to various client sites within the U.S. is required. Competitive salary offered. Apply by resume to: Eduardo Santos, President, Custom Software Solutions, Inc., 1002 Williamson Lane, Snellville, GA 30078. Attn: Job PS.

Positions are available for Systems Support Engineers and Product Consultants with an Atlanta-based e-business technology company. The company provides solutions that enable corporations and software providers to leverage emerging technologies to more effectively compete in the global market.

The Systems Support Engineers will be responsible for providing software expertise in developing and producing software systems for three-tier Middleware development and production packages that reside on UNIX and NT servers.

The Product Consultants will be responsible for planning, developing, and implementing custom middleware applications at customer sites using JAVA, Visual Basic and C++ to design, develop, implement and test software projects.

Candidates for the Systems Support Engineer positions should possess a Bachelor's degree in Computer Science or a related field and at least one year's experience in systems support for middleware technology using JAVA.

Candidates for the Product Consultant positions should possess a Bachelor's degree in Computer Science or a related field and at least two years' experience in software design and development implementing middleware technology or with enabling and database technologies including XHTML and XML or JAVA, and demonstrated knowledge of AS 400 technology. Ability to travel 100% of time.

Apply by mail with resume to:
Cindy Mayer
400 Perimeter Center Terrace
Suite 195
Atlanta, Georgia 30346

SOFTWARE Positions open at Callidus Software, San Jose

Sr. Software Engineers; Software Engs., Technical Consultants

Some positions req. travel

Send resumes to recruiting@CallidusSoftware.com REF #I-331

AD INDEX

SALES OFFICES

Computerworld Headquarters:
500 Old Connecticut Path, PO Box 9171, Framingham, MA 01701-9171
Phone: (508) 879-0700, Fax: (508) 875-4394

President/CEO/Publisher
Joseph L. Levy

Senior Vice President/Associate Publisher
Sherry Driscoll-Coleman

NORTHWEST

ACCOUNT DIRECTOR: Kevin Ebmeyer **SALES ASSOCIATE:** Chris Flanagan, 177 Bovet Road, Suite 400, San Mateo, CA 94402, (650) 357-0200, Fax: (650) 524-7000

BAY AREA

REGIONAL VICE PRESIDENT/WEST COAST SALES: John Topping **VICE PRESIDENT/KEY ACCOUNTS:** Linda Holbrook **ACCOUNT DIRECTORS:** Kevin Ebmeyer, Kelly Mahoney, Debbie Sanch, Michelle Yates; **SALES OPERATIONS MANAGER:** Emme Hung, **SALES ASSOCIATE:** Christy Berger, 177 Bovet Road, Suite 400, San Mateo, CA 94402, (650) 357-0200, Fax: (650) 524-7000

SOUTHWEST

ACCOUNT DIRECTOR: Michelle Yates, (949) 250-3942, Fax: (949) 476-8724 **SENIOR SALES ASSOCIATE:** Joan Dellarobba, (949) 442-4053, Fax: (949) 476-8724 18831 Von Karman Avenue, Suite 200, Irvine, CA 92612

SOUTHERN CENTRAL STATES

ACCOUNT DIRECTOR: Tom Buckley, 3602 Green Emerald Terrace, Austin, TX 78739, (512) 280-7494, Fax: (512) 280-7104, **SALES ASSOCIATE:** Cathy Vice, 1011 East Touhy Avenue, Suite 550, Des Plaines, IL 60018, (847) 827-4433, Fax: (847) 827-0690

NORTHERN CENTRAL STATES WEST

REGIONAL VICE PRESIDENT: Elayne Long **SALES ASSOCIATE:** Cathy Vice, 1011 East Touhy Avenue, Suite 550, Des Plaines, IL 60018, (847) 759-2716, Fax: (847) 827-0690

NORTHERN CENTRAL STATES EAST

ACCOUNT DIRECTOR: Maureen Grady, Mack - Cali IV, 61 South Paramus Rd, 3rd Floor, Paramus, NJ 07652, (201) 587-0090, Fax: (201) 587-9255, (201) 587-1289

NORTHEAST

ACCOUNT DIRECTORS: Laura Mannone, Paul Reiss; **FIELD MARKETING ASSOCIATE:** Deborah Crimmings, 500 Old Connecticut Path, Framingham, MA 01701, (508) 879-0700, Fax: (508) 270-3882

METRO NEW YORK

ACCOUNT DIRECTORS: Fred LoSapio, John Bosco, Maureen Grady; **FIELD MARKETING ASSOCIATE:** John Rattmek; **SALES & OFFICE ASSOCIATE:** Susan Kusnic, Mack - Cali IV, 61 South Paramus Rd, 3rd Floor, Paramus, NJ 07652, (201) 587-0090, Fax: (201) 587-9255, (201) 587-1289

SOUTHEAST

ACCOUNT DIRECTOR: Lisa Ladle-Wallace, 5242 River Park Villas Dr, St. Augustine, FL 32092, (800) 779-5622, Fax: (800) 779-6622

KEY ACCOUNTS

VICE PRESIDENT: Linda Holbrook, **FIELD MARKETING ASSOCIATE:** Elisa Phillips, 177 Bovet Road, Suite 400, San Mateo, CA 94402 (650) 357-0200 Fax: (650) 524-7000

COMPUTERWORLD

PRODUCTION: Production Manager/Beverly Wolff; **PRINT DISPLAY ADVERTISING:** (508) 620-7747, Fax: (508) 879-0446 **DISTRIBUTION:** Distribution Manager/Bob Wescott; **AUDIENCE AND MARKET RESEARCH:** Director/Joanne Otten; Research Analyst/Seanna Maguire

STRATEGIC PROGRAMS AND EVENTS

BOSTON: Vice President Strategic Programs and Events/Leo Leger; Director, Sales and Marketing, Strategic Programs and Events/Ann Harris, Group Manager Strategic Programs and Events/Michael Meleady; Event Operations Manager/Bernice Osborne; Event Operations Coordinator/Lynn Mason; Conference Coordinator/Nanette Jurgelewicz; Event Program Coordinators/Kate Davis, Pam Malingowski; Administrative Coordinator/Shari Redan; Senior Graphics Production Coordinator/Heidi Broadley, 500 Old Connecticut Path, Box 9171, Framingham, MA 01701-9171 (508) 879-0700, Fax: (508) 875-6310

ONLINE ADVERTISING

Director of Online Sales/Operations Gregg Pinsky, (508) 271-8013, Manager of Online Sales/Business Development, Matt Duffy (508) 820-8145, 500 Old Connecticut Path, Box 9171, Framingham, MA 01701-9171, Fax: (508) 879-0446

ITCAREERS ADVERTISING SALES OFFICES

Vice President-General Manager/Jane Crowley; Marketing Director/Kelli Flanagan; Marketing Specialist/Heidi Tanakatsubo; Operations Director/Donna Kent; Advertising Coordinator/Leilani Lopez; Sales Associates/Tina Silveira, Nikki Wilson, 155 Bovet Road, Suite 101, San Mateo, CA 94402 (800) 762-2977, Fax (650) 286-2770 **EAST:** Regional Manager/Deanne Holtze, (516) 466-3760; **MIDWEST:** Regional Manager/Laura Williamson, (773) 529-7011 **WEST:** Regional Account Manager/Patricia Sheppard, (650) 312-0551

LIST RENTAL- POSTAL: Rich Green (508) 370-0832, e-mail: rich_green@idg.com **LIST RENTAL- E-MAIL:** Christine Cahill (508) 370-0808, e-mail: christine_cahill@idg.com **MAILING ADDRESS:** IDG List Services, P.O. Box 9151, Framingham, MA 01701-9151, FAX: (508) 370-0020

ADVERTISERS INDEX

Autonomy www.autonomy.com	29
Canon www.canon.com	43
Computer Associates www.ca.com	4
Exodus www.exodus.com	21
Fujitsu Software www.odtools.com	47
Hewlett-Packard www.hp.com	48, 18-19
IBM CrossWorlds www.ibm.com	64
IBM Storage www.ibm.com	32-33
InterSystems Corp. www.intersystems.com	13
Keynote Systems www.keynote.com	11
Microsoft Project 2002 www.microsoft.com	22-23
NTT Communications www.ntt.com/verio	41
Oracle Corp. www.oracle.com	9
Palm www.palm.com	37
Qualcomm www.qualcomm.com	53
Rational Software www.rational.com	45
Red Hat www.redhat.com	51
Sprint www.sprint.com	15, 17
Storage Networking World Online www.snwonline.com	55
Sun Microsystems www.sun.com	2-3
Veritas www.veritas.com	26
Vignette www.vignette.com	39

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

COMPUTERWORLD

President/CEO/Publisher
Joseph L. Levy

Chief of Staff
Laureen Austermann
(508) 820-8522

Vice President/CIO
Rick Broughton
(508) 620-7700

Vice President/Marketing
Derek Hulitzky
(508) 620-7705

Vice President/Editor in Chief
Maryfran Johnson
(508) 620-7724

Vice President/ Production
Carolyn Medeiros
(508) 620-7733

Vice President/General Manager Strategic Programs
Ronald L. Milton
(508) 820-8661

Executive Vice President
Matthew C. Smith
(508) 820-8102

Senior Vice President/ Circulation
Carol A. Spach
(508) 935-4038

INTERNATIONAL DATA GROUP

CHAIRMAN OF THE BOARD, *Patrick J. McGovern* **PRESIDENT/CEO,** *Kelly Conlin*

IDG Computerworld is a publication of International Data Group, which informs more people world-wide about information technology than any other company in the world. With annual revenues of $2.35 billion, IDG is the leading global provider of IT media, research, conferences and expositions. IDG publishes more than 295 computer newspapers and magazines and 700 book titles in 75 countries, led by Computerworld/Infoworld, Macworld, Network World, PC World, Channel World, and the "For Dummies" global product lines. IDG offers online users the largest network of technology sites around the world through IDG.net (http://www.idg.net), which comprises more than 225 targeted web sites in 55 countries. IDG is also a leading producer of 168 computer-related expositions in 35 countries, and its research arm, International Data Corporation (IDC), provides computer industry research and analysis through 49 offices in 41 countries world-wide. Company information is available at http://www.idg.com

HAVE A PROBLEM WITH YOUR COMPUTERWORLD SUBSCRIPTION?

We want to solve it to your complete satisfaction, and we want to do it fast. Please write to:

Computerworld, P.O. Box 512, Mt. Morris, IL 61054-0512.

Your magazine subscription label is a valuable source of information for you and us. You can help us by attaching your magazine label here, or copy your name, address, and coded line as it appears on your label. Send this along with your correspondence.

Address Changes or Other Changes to Your Subscription

All address changes, title changes, etc. should be accompanied by your address label, if possible, or by a copy of the information which appears on the label, including the coded line.

Your New Address Goes Here: **Address shown:** ❑Home ❑Business

NAME

COMPANY

ADDRESS

CITY STATE ZIP

Other Questions and Problems

It is better to write us concerning your problem and include the magazine label. Also, address changes are handled more efficiently by mail. However, should you need to reach us quickly the following toll-free number is available: **1-800-552-4431**

Outside U.S. call (815) 734-1180. Internet address: circulation@computerworld.com

COMPUTERWORLD allows advertisers and other companies to use its mailing list for selected offers we feel would be of interest to you. We screen these offers carefully. If you do not want to remain on the promotion list, please write to the following address: COMPUTERWORLD, Circulation Department, 500 Old Connecticut Path, Framingham, MA 01701.

How to Contact Computerworld

TELEPHONE/FAX

Main phone number (508) 879-0700
All editors unless otherwise noted below
Main fax number (508) 875-8931
24-hour news tip line (508) 620-7716

E-MAIL

Our Web address is **www.computerworld.com.**
All staff members can be reached via e-mail using the form: **firstname_lastname@computerworld.com.**

All IDG News Service correspondents can be reached using the form: **firstname_lastname@idg.com.**

LETTERS TO THE EDITOR

Letters to the editor are welcome and should be sent to: **letters@computerworld.com.** *Include your address and telephone number.*

MAIL ADDRESS

PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701

SUBSCRIPTIONS/BACK ISSUES

Subscription rates: U.S., $68/year; Canada, $110/year; Central and South America, $250/year; all others, $295/year

Phone (800) 552-4431
E-mail circulation@computerworld.com
Back issues (508) 988-7590

REPRINTS/PERMISSIONS

Phone Ray Trynovich (717) 399-1900, ext. 124
E-mail rtry@rmsreprints.com

CONTACTING CW EDITORS

We invite readers to call or write with their comments and ideas. It is best to submit ideas to one of the department editors and the appropriate beat reporter.

Editor in Chief Maryfran Johnson (508) 820-8179
Editorial Director, Print/Online Patricia Keefe (508) 820-8183

DEPARTMENT/BUREAU EDITORS

News Editor Dan Tynan (508) 620-7714
Assistant News Editor Craig Stedman (508) 820-8120
Business and Careers Editor Thomas Hoffman (845) 988-9630
Technology Editor Tommy Peterson (508) 620-7729
Washington Bureau Chief Mitch Betts (202) 737-8049
West Coast Bureau Chief Pimm Fox (650) 524-7116

REPORTERS

Mobile computing/wireless; health care Bob Brown (301) 277-8069
Intel PCs and servers; messaging; travel Jennifer DiSabatino (508) 820-8122
ROI; careers; labor Julia King (610) 532-7599
Financial services; storage; IT management Lucas Mearian (508) 820-8215
Middleware; internetworking; network systems mgt.; energy; public sector; online procurement Michael Meehan (508) 620-7704
General assignment; transportation/carriers; automotive Linda Rosencrance (508) 626-4734
Microsoft; application development; retail industry Carol Sliwa (508) 626-4731
ERP; supply chain; CRM; databases; data warehousing; General assignment Marc L. Songini (508) 820-8182
State/federal government; antitrust; legal issues; politics Brian Sullivan (508) 620-7760
Patrick Thibodeau (202) 737-8081
Security; defense and aerospace Dan Verton (703) 321-2277
Enterprise systems; ASPs/ outsourcing; security; heavy manufacturing; General assignment; Linux and Unix operating systems Julaine Vuyan (630) 978-8380
Todd Weiss (717) 560-5255

OPINIONS

Senior News Columnist Frank Hayes (503) 252-0100
Columns Editor Rick Saia (508) 820-8118

FEATURE EDITORS

Special Projects Editor Ellen Farmer (508) 820-8204
Editor at Large Mark Hall (503) 391-1158
Reviews Editor Russell Kay (508) 820-8175
Technology Evaluations Editor Robert L. Mitchell (508) 820-8177

FEATURE WRITERS

Gary H. Anthes (202) 737-7242
Matt Hamblen (508) 820-8567
Kathleen Melymuka (508) 628-4931
Deborah Radcliff (707) 829-5823
Melissa Solomon (212) 742-1845

COMPUTERWORLD.COM

Director, online and design Tom Monahan (508) 820-8218
Managing editor/online Sharon Machlis (508) 820-8231
Online news editor Ken Mingis (508) 820-8545
Online news editor Marvin Prokop (508) 820-7717
Communities director Vanessa DiMauro (508) 620-8110
Communities senior editor/writer Rick Saia (508) 820-8118
Communities builder Barbara Sternberg (508) 620-7782
Associate art director David Waugh (508) 820-8142
Associate art director John R. Brillon (508) 820-8216
Kesley Guillemin, marketing associate/researcher; Peter Smith, **Web development manager;** Kevin Gench, Mark Savery, **Web developers;** Bill Rigby, **associate Web developer;** David Rantel, **online production coordinator and e-mail newsletter editor;** Matthew Morong, **graphic designer**

RESEARCH

Mari Keefe, **research manager;** Gussie Wilson, **research associate**

COPY DESK

James Eckle, **managing editor/production** (508) 820-8202; Jean Consilvo, **assistant managing editor/production;** Michele Lee, Bob Rawson, **senior copy editors;** Jacqueline Day, Eugene Demaitre, Mike Parent, Monica Sambataro, **copy editors**

GRAPHIC DESIGN

Stephanie Faucher, **design director** (508) 820-8235; April O'Connor, **associate art director;** Julie D'Errico, **graphic designer;** Susan Cahill, **graphics coordinator;** Rich Tennant, John Klossner, **cartoonists**

ADMINISTRATIVE SUPPORT

Linda Gorgone, **office manager** (ext. 8176); Cheryl Dudek (ext. 8176)

CONTRIBUTING COLUMNISTS

David Foote, Michael Gartenberg, Dan Gillmor, Thornton A. May, David Moschella, Bert Perlins, Nicholas Petreley, Fran Quittel, Paul A. Strassmann

CONTRIBUTING WRITERS

Kevin Fogarty, Amy Helen Johnson, Mathew Schwartz

COMPANIES IN THIS ISSUE

Page number refers to page on which story begins. Company names can also be searched at **www.computerworld.com**

A.G. EDWARDS & SONS INC. 6
ABERDEEN GROUP INC. 1
AERONAUTICAL RADIO INC 1
AETNA INC 7,10,24
ALLIED BUILDING PRODUCTS CORP 6
AMERICAN AIRLINES INC. 10,28
AMERICAN INTERNATIONAL GROUP INC. 10
AMERICAN MEDICAL ASSOCIATION 28
ANDAMEN SYSTEMS INC. 20
ANDREWS & KURTH LLP 6
ASU SOLUTIONS INC. 28
BEA SYSTEMS INC 20,30,40,52
BLUE CROSS BLUE SHIELD 6
BURLAND SOFTWARE CORP 20
BRIDGEGATE LLC 20
BROWN + PARTNERS INC 61
CABLE & WIRELESS USA INC 44
CADWALADER, WICKERSHAM & TAFT 62
CAPCO 6
CARNEGIE MELLON UNIVERSITY 12,24
CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES 1
CHECKFREE CORP 7
CHRYSLER CORP 38
CISCO SYSTEMS INC 12,14,20
CITIBANK 46
CITIGROUP INC 27
COLGATE-PALMOLIVE CO. 61
COMCAST CORP 61
COMERICA BANK 24
COMPAQ COMPUTER CORP 20,44
COMPUTER ASSOCIATES INTERNATIONAL INC 10,20
COMPUTER SCIENCES CORP 10
COMPUWARE CORP 6
CREDANT TECHNOLOGIES 28
DAIMLERCHRYSLER AG 1
DALLAS/FORT WORTH INTERNATIONAL AIRPORT 1
DATA ACCESS CORP 44
DEFENSE INFORMATION SYSTEMS AGENCY 1
DELL COMPUTER CORP 10
DEUTSCHE BANK AG 6
DEVX.COM INC 38
DIDNCO INC. 10
DOMEX CORP 61
DOCUMENTUM INC. 20
E.PIPHANY INC 20
EDGEN LLC 40
EDOCS INC. 38
ELECTRONIC DATA SYSTEMS CORP 1,10,24
ENRON CORP 38
ENTERASYS NETWORKS INC 6
ENTERPRISE STORAGE GROUP INC. 20
ENTRUST INC 40
EXPERIAN 6
FINANCIAL SERVICES COORDINATING COUNCIL 6
FLEET SECURITIES INC 6
FORD MOTOR CO 1,6
FORRESTER RESEARCH INC. 30,59
GARTNER INC. 8,7,10,12,14,30,58,40
GENERAL MOTORS CORP 1
GIGA INFORMATION GROUP INC. 30,35
GLOBAL OUTSOURCING 61
HEWLETT-PACKARD CO 20,30,26,44
HI-TECH PARTS LLC 61
HURWITZ GROUP INC 40
IBM 7,10,18,20,30,34,38,40,44,52
IDCONCEPTS, INC. 61
ILLUMINATA INC 7,30
INFONET SERVICES CORP 14
INFORMATION TECHNOLOGY ASSOCIATION OF AMERICA 24
INTEL CORP 7
INTERNATIONAL DB2 USERS GROUP 7
INTERWOVEN INC 35
KAZOO SOFTWARE INC 35
KEYCORP 30
KURT SALMON ASSOCIATES 10
LANDS' END INC 10
LEARNING TREE INTERNATIONAL INC 52
LIBERTY ALLIANCE 20
LIMITED TECHNOLOGY SERVICES INC 53
LINDOWS.COM INC 10
LOCKHEED MARTIN CORP 28
LUCENT TECHNOLOGIES INC 30
MATSUSHITA ELECTRIC CORPORATION OF AMERICA 40
MEDIAPATH NETWORKS INC 6
MELLON FINANCIAL CORP 10
META GROUP INC 30
MICROSOFT CORP 6,10,12,15,20,25,27,28,30,38,40,44,54,62
MINDTREE CONSULTING 24
MOTOROLA INC 44
NASA 62
NATIONAL RESEARCH COUNCIL 62
NAVAL AIR SYSTEMS COMMAND 18
NESS TECHNOLOGIES INC 25
NETEGRITY INC 40
NETMANAGE INC 44
NETSEC INC 1
NETWORK ASSOCIATES INC. 6
NETWORKCAR INC. 20
NEW UNITED MOTOR MANUFACTURING INC 1
NISHAN SYSTEMS INC 20
NORTEL NETWORKS LTD 6,40
NOVELL INC 20,44
OBLIX INC 20,40
ORACLE CORP 7,12,16,30,44,64
ORBITZ LLC 16
PACIFIC LIFE INSURANCE CO 20
PALACE RESORTS INC 44
PENCOM SYSTEMS INC 38
PORTLAND STATE 24
PROVIDENCE HEALTH PLAN 6
QWEST COMMUNICATIONS INTERNATIONAL INC 6
REALNAMES CORP 38
RED HAT INC 20
RSA SECURITY INC. 1
SABRE INC 44
SAN JOSE STATE UNIVERSITY 28
SAP AG 10,30
SEARS, ROEBUCK AND CO 62
SECURITIES AND EXCHANGE COMMISSION 8,20
SECURITIES INDUSTRY ASSOCIATION 6
SHARP CORP 38
SIEBEL SYSTEMS INC 44
SOCIETY OF WORLDWIDE INTERBANK FINANCIAL TELECOMMUNICATIONS 6
SOFTWARE AG 38
SOFTWARE ENGINEERING INSTITUTE 48
SUN MICROSYSTEMS INC. 10,60,21,28,38,52
SUPERIOR INFORMATION SERVICES LLC 44
SUSTAINABLE COMPUTING CONSORTIUM 62
SYBASE INC 44,64
SYMANTEC CORP 20
SD BANK FINANCIAL GROUP 20
TERADYNE INC. 48
TEXAS A&M UNIVERSITY 38
THE CLIPPER GROUP 20
THE HOME DEPOT INC. 30
THE LIMITED INC 50
THE MIND ELECTRIC INC. 35
THE VANGUARD GROUP INC. 52
THE YANKEE GROUP 6
TIVOLI SYSTEMS INC. 30
TOYOTA MOTOR CORP 1
TROLLTECH AS 64
U.S. ARMY 38
U.S. CHAMBER OF COMMERCE 6
U.S. DEPARTMENT OF DEFENSE 1
U.S. DEPARTMENT OF STATE 18
U.S. NAVY 1,18
UNIVERSITY OF MANCHESTER 28
UNIVERSITY OF MIAMI 28
VAULT.COM 24
VERISIGN INC. 30
VICTORIA'S SECRET 30
WEBMETHODS INC 44
WHERENET CORP 1
WORLDCOM INC 6
XEROX CORP 46
YAHOO INC. 20,24

Bulgaria: The Next Offshore Frontier

Low rates, advanced skill sets, language compatibilities of programmers lauded

BY THOMAS HOFFMAN

THEY'RE FAST, they're cheap and they're highly skilled.

They are Bulgarian programmers, who, according to their customers, deliver on Web development efforts from overseas in a fraction of the time it would have taken their American counterparts — and at a substantial discount.

On top of that, customers say the Bulgarian programming teams they have dealt with through their contracts with Philadelphia-based iConcepts Inc. typically respond to glitches overnight and speak fluent English.

Hi-Tech Parts LLC, a Plymouth, Mass.-based firm that provides an online database for buyers and sellers of computer components, evaluated four consulting firms — two in the U.S. and two in Canada — before settling on iConcepts in January to rebuild its site.

Fast Service

Of the four companies that bid on the search-and-retrieval project, iConcepts "was the only one that could rebuild my site in three months. Everyone else said six months or more and at a much higher cost," said Kristal Snider, Hi-Tech's president.

The Bulgarian programming team was able to get Hi-Tech's site rebuilt and running by March. Though Snider wouldn't disclose how much Hi-Tech paid iConcepts to rebuild its site, she did say, "I would have paid six figures had I not brought them in."

Said Snider, "You could put together a team of [Bulgarian] programmers there for what you might pay for one or two [programmers in the U.S.]."

Though IT managers should consider a variety of factors beyond cost in assessing offshore programming contracts [QuickLink: 29877], the one-two punch of the Sept. 11 attacks and the downturn in IT spending have forced offshore programming costs downward this year.

At programming houses in India, where 80% to 90% of offshore development deals are handled, the "blended rates" for teams of programmers, managers and software testers have dropped from $30 an hour in 2001 to about $20 to $25 an hour this year, said Marty McCaffrey, executive director at Global Outsourcing, a Salinas, Calif.-based research and consulting firm that specializes in offshore outsourcing.

But as the economy improves, companies that have been stalling software development and integration projects will pump up demand — and labor rates — for offshore programming firms in India, Israel, the Philippines and other markets, said McCaffrey.

Other companies have also had success taking their online search-and-retrieval projects to iConcepts and its Bulgarian counterparts. For instance, Dionex Corp., a Sunnyvale, Calif.-based manufacturer of chromatography instrumentation, needed a stand-alone engine for its sales staff and customers to search its documentation and product data. For an initial $11,000 fee, iConcepts and its Bulgarian programming team were able to develop a CD-ROM for Dionex and its customers, helping to slash the company's document management costs by $23,000 per year.

As a result, the initial investment "paid for itself twice over in the first year," said Doug Jamieson, Dionex's director of consumables manufacturing.

Programmable Pay

The average first-year salaries for highly trained software professionals:

India	$5,000 - $15,000
China	$5,000 - $15,000
Russia	$5,000 - $15,000
Poland	$10,000 - $20,000
Philippines	$10,000 - $20,000
Bulgaria	$10,000 - $20,000

Note: Salaries are for software professionals with at least a bachelor's degree and two years of experience. Compensation includes salary, bonuses and benefits. Currency values are based on purchasing power parity.

Continued from page 1

GM LANs

send and receive information to and from workers and systems in the manufacturing environment. "It provides you with agility and flexibility that did not exist before," Graham said. GM plans to standardize on Wi-Fi, or 802.11b, wireless LAN technology in all of its plants, he added.

The rugged enclosures for the access points and the tuned, directional antennas required to propagate a signal inside a plant without having it spill outside cost $1,000 each.

But Graham said GM expects a quick payback on its investment — less than one year. He declined to elaborate further on the financial details.

Jack Maynard, an analyst at Boston-based Aberdeen Group Inc., said the fact that GM expects to recoup its investment so quickly indicates that the company had "a real problem" with locating parts expeditiously and efficiently.

JUST THE FACTS

GM LANscape

GM's wireless LAN infrastructure will cover 25 manufacturing plants; 35 to 65 access points will cover an 80-acre plant.

HARDWARE: Access points from Cisco Systems Inc.; rugged devices running Microsoft OS supplied by Symbol Technologies and Intermec Technologies Corp.

INITIAL APPLICATIONS: Materials management

FUTURE APPLICATIONS: Real-time location system; access to "virtual factory" database and CAD drawings

PAYBACK/ROI: Less than one year

SECURITY: 128-bit Wired Equivalent Privacy; subnetted VPNs; tuned, directional antennas

MIGRATION PATH: Designed for upgrade to 54M bit/sec. 802.11a or 802.11g

Maynard added that GM could use the wireless LAN-based materials management system to drastically change its manufacturing operation to a build-to-order model.

GM has already equipped 75 to 100 forklift trucks with wireless terminals in each plant. In its New United Motor Manufacturing Inc. plant in Fremont, Calif., which it operates jointly with Japan-based Toyota Motor Corp., GM has installed a wireless location system from WhereNet Corp. in Santa Clara, Calif., that works with the wireless LAN.

When workers need to replenish parts for their station, they press a button on a wireless pendant at their workstation. The request is displayed on a screen on the forklift, showing the location of the worker and the materials required. Tripiett said he views vehicle-tracking information as another high-priority application for the wireless system.

Ford Motor Co. and DaimlerChrysler AG both operate extensive wireless LAN networks at their North American manufacturing plants, but neither currently has plans to install an infrastructure equal in scope to GM's.

Jim Buczkowski, director of manufacturing and supply chain IT at Ford, said the company has installed wireless LANs at all 21 of its North American assembly plants, but with zoned coverage rather than plantwide coverage.

Ford uses wireless LANs in the yards of all its plants to control and manage finished-vehicle inventory and has experimented with installing wireless terminals on forklifts, Buczkowski said. But Ford hasn't been able to justify a business case for wide-scale rollout of wireless terminals on forklifts, he said.

Elive Likine, manager of wireless communications at DaimlerChrysler, said the company has older wireless LANs that operate in the 902-MHz band that are used to support yard operations. The automaker has also installed 802.11b wireless LANs, which operate in the 2.4-GHz band, at some of its plants to support specific applications such as "end of line" testing of electrical components.

DaimlerChrysler plans to stick with the 902-MHz wireless LANs for now because "we do not see a business case to shift from 902 MHz to 2.4 GHz," Likine said.

Periodical postage paid at Framingham, Mass., and other mailing offices. Posted under Canadian International Publication agreement #0088697. CANADIAN POSTMASTER: Please return undeliverable copy to PO Box 1632, Windsor, Ontario N9A 7C9. Computerworld (ISSN 0010-4841) is published weekly, except a single combined issue for the last two weeks in December by Computerworld, Inc., 500 Old Connecticut Path, Box 9171, Framingham, Mass. 01701-9171. Copyright 2002 by Computerworld Inc. All rights reserved. Computerworld can be purchased on microfilm and microfiche through University Microfilms Inc., 300 N. Zeeb Road, Ann Arbor, Mich. 48106. Computerworld is indexed. Back issues, if available, may be purchased from the circulation department. Photocopy rights, permission or photocopy for internal or personal use is granted by Computerworld Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3 per copy of the article, plus 50 cents per page, is paid directly to Copyright Clearance Center, 27 Congress St., Salem, Mass. 01970. Reprints (minimum 100 copies) and permission to reprint may be purchased from Ray Trymaine, Computerworld Reprints, c/o Reprint Management Services, Diversified Corporate Center, 18th Olde Homestead Lane, Lancaster, Pa., 17601, (717) 399-1900, Ext. 104, Fax (717) 399-8900, Web site www.reprintpros.com, E-mail ray@reprintpros.com. Requests for missing issues will be honored only if received within 60 days of issue date. Subscription rates: $5 per copy, U.S. - $165 per year, Canada - $210 per year, Central & So. America $250 per year, Europe - $295 per year, all other countries - $295 per year. Subscriptions call toll-free (800) 552-4431. POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, PO Box 512, Mount Morris, IL 61054-0512.

BPA ABM

Bulgaria: The Next Offshore Frontier

Low rates, advanced skill sets, language compatibilities of programmers lauded

BY THOMAS HOFFMAN

THEY'RE FAST, they're cheap and they're highly skilled.

They are Bulgarian programmers, who, according to their customers, deliver on Web development efforts from overseas in a fraction of the time it would have taken their American counterparts — and at a substantial discount.

On top of that, customers say the Bulgarian programming teams they have dealt with through their contracts with Philadelphia-based iConcepts Inc. typically respond to glitches overnight and speak fluent English.

Hi-Tech Parts LLC, a Plymouth, Mass.-based firm that provides an online database for buyers and sellers of computer components, evaluated four consulting firms — two in the U.S. and two in Canada — before settling on iConcepts in January to rebuild its site.

Fast Service

Of the four companies that bid on the search-and-retrieval project, iConcepts "was the only one that could rebuild my site in three months. Everyone else said six months or more and at a much higher cost," said Kristal Snider, Hi-Tech's president.

The Bulgarian programming team was able to get Hi-Tech's site rebuilt and running by March. Though Snider wouldn't disclose how much Hi-Tech paid iConcepts to rebuild its site, she did say, "I would have paid six figures had I not brought them in."

Said Snider, "You could put together a team of [Bulgarian] programmers there for what you might pay for one or two [programmers in the U.S.]."

Though IT managers should consider a variety of factors beyond cost in assessing offshore programming contracts [QuickLink: 29877], the one-two punch of the Sept. 11 attacks and the downturn in IT spending have forced offshore programming costs downward this year.

At programming houses in India, where 80% to 90% of offshore development deals are handled, the "blended rates" for teams of programmers, managers and software testers have dropped from $30 an hour in 2001 to about $20 to $25 an hour this year, said Marty McCaffrey, executive director at Global Outsourcing, a Salinas, Calif.-based research and consulting firm that specializes in offshore outsourcing.

But as the economy improves, companies that have been stalling software development and integration projects will pump up demand — and labor rates — for offshore programming firms in India, Israel, the Philippines and other markets, said McCaffrey.

Other companies have also had success taking their online search-and-retrieval projects to iCnncepts and its Bulgarian counterparts. For instance, Dionex Corp., a Sunnyvale, Calif.-based manufacturer of chromatography instrumentation, needed a stand-alone engine for its sales staff and customers to search its documentation and product data. For an initial $11,000 fee, iConcepts and its Bulgarian programming team were able to develop a CD-ROM for Dionex and its customers, helping to slash the company's document management costs by $23,000 per year.

As a result, the initial investment "paid for itself twice over in the first year," said Doug Jamieson, Dionex's director of consumables manufacturing.

Programmable Pay

The average first-year salaries for highly trained software professionals:

India	$5,000 - $8,000
China	$6,000 - $8,000
Russia	$5,000 - $8,000
Pakistan	$3,600 - $6,120
Philippines	$8,000 - $10,000
Bulgaria	$3,600 - $6,000

SOURCES: NATIONAL ASSOCIATION OF SOFTWARE AND SERVICES COMPANIES, SOFTWARE ASSOCIATION OF PAKISTAN, GEEKNET MARKET RESEARCH, META GROUP INC. AND WWW.METAGROUP.COM

Continued from page 1

GM LANs

send and receive information to and from workers and systems in the manufacturing environment. "It provides you with agility and flexibility that did not exist before," Graham said. GM plans to standardize on Wi-Fi, or 802.11b, wireless LAN technology in all of its plants, he added.

The rugged enclosures for the access points and the tuned, directional antennas required to propagate a signal inside a plant without having it spill outside cost $1,000 each.

But Graham said GM expects a quick payback on its investment — less than one year. He declined to elaborate further on the financial details.

Jack Maynard, an analyst at Boston-based Aberdeen Group Inc., said the fact that GM expects to recoup its investment so quickly indicates that the company had "a real problem" with locating parts expeditiously and efficiently.

JUST THE FACTS

GM LANscape

GM's wireless LAN infrastructure will cover 25 manufacturing plants; 35 to 65 access points will cover an 80-acre plant.

HARDWARE: Access points from Cisco Systems Inc., rugged devices running Microsoft OS supplied by Symbol Technologies and Intermec Technologies Corp.

INITIAL APPLICATIONS: Materials management

FUTURE APPLICATIONS: Real-time location system; access to "virtual factory" database and CAD drawings

PAYBACK/ROI: Less than one year

SECURITY: 128-bit Wired Equivalent Privacy; subnetted VPNs; tuned, directional antennas

MIGRATION PATH: Designed for upgrade to 54M bit/sec. 802.11a or 802.11g

Maynard added that GM could use the wireless LAN-based materials management system to drastically change its manufacturing operation to a build-to-order model.

GM has already equipped 75 to 100 forklift trucks with wireless terminals in each plant. In its New United Motor Manufacturing Inc. plant in Fremont, Calif., which it operates jointly with Japan-based Toyota Motor Corp., GM has installed a wireless location system from WhereNet Corp. in Santa Clara, Calif., that works with the wireless LAN.

When workers need to replenish parts for their station, they press a button on a wireless pendant at their workstation. The request is displayed on a screen on the forklift, showing the location of the worker and the materials required. Triplett said he views vehicle-tracking information as another high-priority application for the wireless system.

Ford Motor Co. and DaimlerChrysler AG both operate extensive wireless LAN networks at their North American manufacturing plants, but neither currently has plans to install an infrastructure equal in scope to GM's.

Jim Buczkowski, director of manufacturing and supply chain IT at Ford, said the company has installed wireless LANs at all 21 of its North American assembly plants, but with zoned coverage rather than plantwide coverage.

Ford uses wireless LANs in the yards of all its plants to control and manage finished-vehicle inventory and has experimented with installing wireless terminals on forklifts, Buczkowski said. But Ford hasn't been able to justify a business case for wide-scale rollout of wireless terminals on forklifts, he said.

Elive Likine, manager of wireless communications at DaimlerChrysler, said the company has older wireless LANs that operate in the 902-MHz band that are used to support yard operations. The automaker has also installed 802.11b wireless LANs, which operate in the 2.4-GHz band, at some of its plants to support specific applications such as "end of line" testing of electrical components.

DaimlerChrysler plans to stick with the 902-MHz wireless LANs for now because "we do not see a business case to shift from 902 MHz to 2.4 GHz," Likine said.

Periods of postage paid at Framingham, Mass., and other mailing offices. Printed under Canadian International Public ation agreement #0390687. CANADIAN POSTMASTER: Please return undeliverable copy to PO Box 1632, Windsor, Ontario N9A 7C9. Computerworld (ISSN 0010-4841) is published weekly, except a single combined issue for the last two weeks in December by Computerworld Inc., 500 Old Connecticut Path, Box 9171, Framingham, Mass. 01701-9171. Copyright 2002 by Computerworld Inc. All rights reserved. Computerworld can be purchased on microfilm and microfiche through University Microfilms Inc., 300 N. Zeeb Road, Ann Arbor, Mich. 48106. Computerworld is indexed in Data Source. If available, may be purchased from the circulation department. Photocopy rights, permission to photocopy for internal or personal use is granted for Computerworld Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3 per copy of the article, plus 50 cents per page, is paid directly to Copyright Clearance Center, 27 Congress St., Salem, Mass. 01970. Reprints, minimum 500, reprint and permission to reprint may be purchased from Ray Trimarchi, Computerworld Reprints, c/o Reprint Management Services, Greenfield Corporate Center, 699 Oaks Homestead Lane, Lancaster, Pa. 17601, (717) 399-1900, ext. 104, Fax (717) 399-8900. Visit the www.rmsreprints.com. E-mail rtrimarchi@rmsreprints.com. Requests for missing issues will be honored only if received within 60 days of issue date. Subscription rates: $5 per copy; U.S. $99 per year, Canada $140 per year, Central & So. America $250 per year, Europe $206 per year, all other countries $295 per year. Subscribers, call toll-free (800) 552-4431. POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, PO Box 9171, Mount Morris, IL 61054-0917.

BPA ABM

FRANK HAYES/FRANKLY SPEAKING

The Value of Plan B

REALNAMES CORP. is going out of business. That's the company behind the technology that lets you type a keyword into Microsoft's Internet Explorer to go to a Web site, instead of having to use a complete Web address. RealNames went down because its technology wasn't successful enough to keep Microsoft, its most crucial partner, interested. When Microsoft decided not to renew its two-year deal with RealNames past June 30, RealNames closed its doors.

Yes, there's more to the story than that. RealNames also owed Microsoft $25 million and had twice missed deadlines for paying it. RealNames' now-ex-CEO Keith Teare is convinced Microsoft just couldn't accept not being in control of the RealNames piece of the infrastructure. Microsoft says that the RealNames keyword approach just wasn't useful to users and that future versions of Internet Explorer will have some kind of natural-language search function.

What really happened? Judge for yourself: Teare's personal Web log (*www.teare.com*) includes more details, including notes from the May 7 meeting in which Microsoft managers repeatedly explain to Teare that the deal is dead, and Teare keeps looking for ways to resuscitate the corpse.

So why does another dying dot-com matter? Because RealNames isn't the only Internet business that's been on life support since the big dot-com die-off.

Some companies, like RealNames, kept going because they had deals with big customers. Others were bought up by conventional companies that haven't yet managed to absorb them. Still others have just been hanging on by their fingernails, hoping business will improve as the economy gets better.

But as the slump drags on, we're going to see another slow wave of dot-com failures as deals expire, buyers cut their losses and fingernail-hangers run out of faith, hope and money.

And if you depend on a doomed dot-com for any kind of service or technology, you'll be in trouble.

Face it, we're all hunkered down right now — we're not really ready for any sudden disruptions. But if a service provider shuts down, we'll have only weeks, or even just days or hours, to get things back on track.

Frank Hayes, Computerworld's senior news columnist, has covered IT for more than 20 years. Contact him at frank_hayes@computerworld.com.

Consider Asian users of RealNames. For English-language Web sites, RealNames keywords were really just a convenience. But for sites using languages like Chinese or Japanese, RealNames made it possible for users to type in a business name in their native language — much more meaningful than a Web address in English.

Now those businesses are scrambling to warn their users that the familiar keywords won't work after June 30. And in one sense, they're lucky — they still have more than a month before RealNames is completely gone.

What happens if your credit card verification service goes toes-up? Or your search-engine service, or an e-commerce service provider, or some other technology your customers or users need or have simply grown accustomed to? You won't have a month — you'll need a replacement *now*.

So don't wait. Make a list of those outside service suppliers now. (And remember the lessons from your Y2k inventory: You don't know all the places where you're using those services until you look — and you don't know whose services *they* depend on until you ask them.)

Then rank those suppliers by risk and importance to your customers and your IT processes. Investigate alternatives. Figure out what it will cost — in time, reconfiguration effort and lost business — to make a switch if you need to. And, finally, draw up your contingency plans.

Yes, that will cost time and effort you didn't plan to spend in these tight times. But if that contingency plan cuts your recovery time in half, it'll be worth it.

And if service providers go out of business, you don't want them taking you with them — even for a little while. ◗

SHARK TANK

OVEREAGER new manager promises his boss a 30-day schedule for a project to automate passwords on company's mainframe, midrange and desktop systems. We can't do that, desktop support pilot fish tells manager when he sees the project plan. "Have you confirmed that the mainframe and midrange support groups can do the product evaluation in the three days you've allotted?" fish asks. "No," says manager, "but if they don't meet the plan, then it'll be their fault it fails, not mine."

SYSTEMS administrator is describing problems he has hit while replacing a file server's failing hard drive. Senior sysadmin pilot fish interrupts to ask if he did a backup before starting. "No," says sysadmin. But why not? asks perplexed fish. "Well, the new drive I was installing might not have worked," says sysadmin. "What's the point of having a backup if you don't have a drive to put it on?"

EACH TIME IT pilot fish goes to this remote site, it's a $150 cab ride. So fish finds a limo service that'll make the trip for $80 and suggests it to his boss, who sends the proposal upstream. A week later, boss passes along the verdict: "Upper management doesn't want IT workers showing up in nice limos."

MAIL SYSTEM at this manufacturing plant goes down, so IT pilot fish calls vendor's support line. While fish is talking to support, vendor also sends out a local tech – who peers over fish's shoulder and says, "Man, you're way past anything I can help you in." Phone support guy overhears this comment and tells fish, "Yeah, we don't tell those technical support specialists much because we're afraid that they'll change something."

"MY SCREEN is black," user tells help desk pilot fish. "I think I need to replace a fuse." What's on the screen? fish asks. "It's telling me to replace the disk." Do you have a disk in the floppy drive? fish asks. "Omigod, yes!" user says. Remove it, then reboot, fish directs. "Omigod!" repeats user as the PC boots successfully. "No wonder they pay you guys so much!"

Share the wealth: **sharky@computerworld.com**. You get a snazzy Shark shirt if we use your true tale of IT life. And check out the daily feed, browse the Sharkives and sign up for Shark Tank home delivery at *computerworld.com/sharky*.

The 5th Wave

©Rick Tetzeli, www.the5thwave.com

COMPUTERWORLD

WebSphere software

This is the MANAGER

That placed the Order

That went through Accounting

That commissioned Sales

That notified Engineering

That provisioned the Circuits

That connected the Service

That satisfied the Customer

That concluded the Process

That lives in the Business Integration Software

That we built Together.

CROSSWORLDS CrossWorlds has joined with IBM to provide comprehensive business integration from your first step to the finish. Our technology powers WebSphere® to not only just connect your applications — but make all your processes work together. For the whole story, visit **ibm.com**/websphere/crossworlds

IBM

e business software

IT'S A DIFFERENT KIND OF WORLD.
YOU NEED A DIFFERENT KIND OF SOFTWARE.

IBM, WebSphere and the e-business logo are registered trademarks of International Business Machines Corporation in the United States and/or other countries. CrossWorlds and the CrossWorlds logo are registered trademarks of CrossWorlds Software Inc. © 2002 IBM Corp. All rights reserved.